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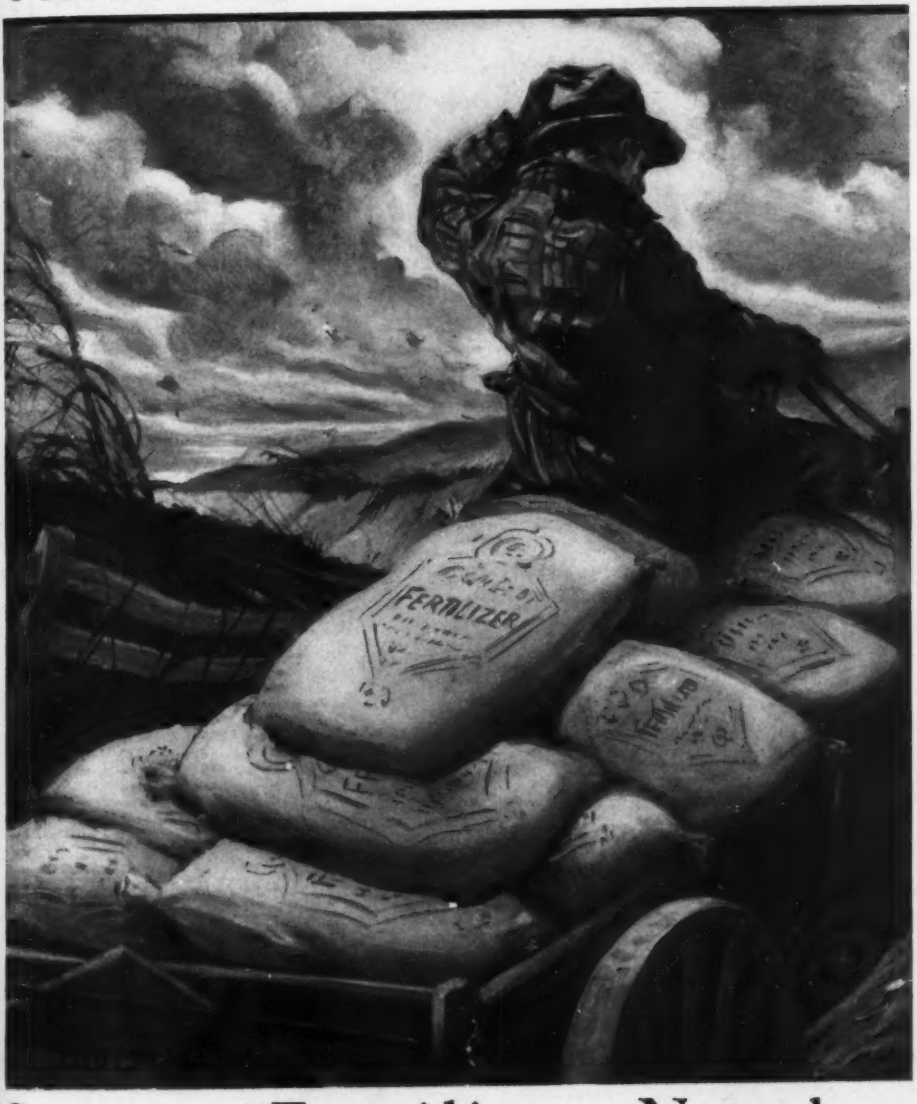

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The Whole Truth—Not Selected Truth

R. H. STINCHFIELD, *Managing Editor* SID NOBLE, *Editor*

Editorial Offices: 19 West 44th Street, New York

VOLUME XVI NUMBER THREE

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A MARCH DAY ON RIVERSIDE DRIVE, NEW YORK CITY.

Better Crops with PLANT FOOD

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Jeff Gets Serious in Considering—

A. E. *and* U. S.

By Jeff McDermid

WHEN A. E. (George Russell) blinked through double lenses at me in the corridor of a hotel during the American Country Life Conference, I should have requested an interview. His sturdy bulk and ruddy British appearance behind that tawny beard gave me little cue to his poetic nature or his Utopian idealism. He looked so much like a banker or a successful statesman that I missed the great chance to accomplish a tete-a-tete between the two great, free-lance philosophers of the age—ergo, his favorite author and mine!

Luckily, I chanced to receive from his American sponsors a copy of his treatise on The National Being, a booklet that I have gone into quite carefully during the spare hours between jitney jaunts to work and sundry domestic duties. It must be sufficient for me to have clasped hands with him and murmured a trite tribute to him on his luncheon address. It

is too late to mend my broken opportunity; but I shall weave some of my commentary into the thread of his discussion, begging your pardon for this cotton warp in the woof of his silken sentiments.

Although A. E. frankly states that his thought is mainly for the aid of newly emerging zones of self-determination, I find it strangely fertile ground in which to look for the tares sown by the cultivators of far older democratic fields. If A. E. considers he is confining himself modestly within the social laboratory of Ireland, he has at least held up the mental mirror at a certain Anglo-American angle which gives one reflections of conditions over here.

PERHAPS it is not easy to teach older dogs the newer tricks, but perhaps A. E. has shown our own mastiffs where their bones of puppyhood lie buried. Is it worth while to dig them up? Yet no moral teacher can put danger signals on the course of a newly born democracy without reference to the blunders of an older order. This, and his zest for the old rural questions ever new, form the excuse for my intrusion.

After stating his theme, which is that any aspiring nation must realize and define its national character and inward spirit and be concerned with the soul as well as the substance, he writes as follows:

"When we begin to build up a lofty world within the national soul, soon the country becomes beautiful and worthy of respect in its externals. That building up of the inner world we have neglected. Our excited political controversies, our playing at militarism, have tended to bring men's thoughts from central depths to surfaces. Life is drawn from its frontiers away from its spiritual base, and behind the surfaces we have little to fall back upon. Few of our notorieties could be trusted to think out any economic scheme or social problem thoroughly and efficiently. They have been engaged in passionate attempts at the readjustment of the superficies of things. What we require more than men of action at present are scholars, economists, scientists, thinkers, educationalists, and litterateurs, who will populate the desert depths of national consciousness with real thought and turn the void into a fullness. We have few reserves of intellectual life to draw upon when we come to the mighty labor of nation building. It will be indignantly denied, but I think it is true to say that the vast majority of people in Ireland do not know the difference between good and bad thinking, between the essential depths and the shallows in humanity."

PONDERING what he has said, we find that America has indeed gone through its early period of empire expansion and almost reached the boundaries of its physical growth. The descendants of the frontiersmen must be content to join hands with the newer immigrants in whatever we shall make out of it hereafter. There is no longer any chance for our idealists to elope with their visions into some fresh countryside to dream and build anew. There is no new country here any longer or any relief from the inroads of standardization and corporate dominance. Only the burning desert or the lofty mountain peak afford such hermitage in America, and few there are who listen to voices that have no broadcasting license or assigned wave length. It is quite plausible to believe that whatever new springs of energy and hope we have in reserve must come from mental and spiritual forces within us rather than, as before, from unconquered material resources.

A. E. says that Ireland needs scholars and thinkers and poets more than men of materialistic action. To me it seems that we of America require

(*Turn to page* 60)

Feed Tobacco Well

Pennsylvania Farmers Find It Pays

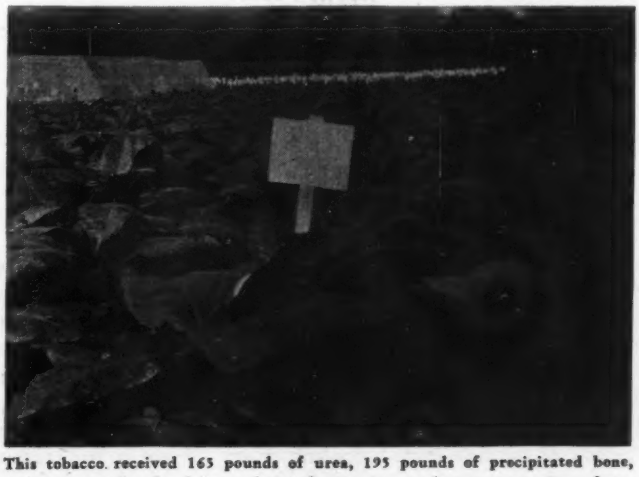
By D. E Haley

Professor of Soil and Phytochemistry, Pennsylvania State College

THE system of agriculture followed by the farmers of Lancaster county, Pennsylvania, may well serve as an example of efficiency for many other farming communities in the United States, in that it involves *addition* rather than *subtraction.* In other words, Lancaster county farmers pride themselves in doing all that is humanly possible to keep their soils in a high state of fertility through the liberal use of lime, stable manure, commercial fertilizers, and carefully planned crop rotations which always include legumes.

The original soils were quite fertile and they were selected by the early German settlers for this reason. These settlers, we are told, were representatives of the twenty-fifth successive generation of farmers in their mother country, and thus were well qualified to recognize the crop-producing powers of a soil from a study of the native vegetation. After a farm had been chosen, it was handed down from father to son through successive generations. It has been our privilege, on several occasions, to visit some of these farms which have been operated by the same family for more than 200 years, and which still are in a high state of fertility. The Ephrata Station is located on one of these farms.

Field work on Pennsylvania tobacco is being conducted at Ephrata, Lancaster county, and Lock Haven, Clinton county. The greater part of this work, however, is conducted at the Ephrata Station under the direction of the Office of Tobacco Investigations, U. S. Bureau of Plant Industry, in cooperation with The Pennsylvania State College. This work is supervised by Otto Olson, who has been interested in investigations dealing with cigar-



This tobacco received 165 pounds of urea, 195 pounds of precipitated bone, and 600 pounds of sulphate of potash per acre, and was grown in a four-year rotation. It yielded 2,080 pounds per acre. (Ephrata Station)

leaf tobacco for a long period, and is thoroughly familiar with the agricultural conditions prevailing in that locality.

We believe that field experiments relating to the tobacco crop of this locality should conform, as closely as possible, to the general agricultural system now in operation and which, no doubt, was in vogue long before any tobacco investigations were conducted. This policy has been rigidly followed at the Ephrata Station, but the results of the investigations lead us to believe that some modifications could be made in the prevailing methods of growing tobacco for both yield and quality, without seriously interfering with the present general program.

The Lancaster county system of soil treatment is highly satisfactory as regards crop yields and the preservation of fertility, but the soil today is not necessarily as capable of producing as good a quality of tobacco as it was when first placed under cultivation. While we have no experimental data to show whether this is true or not, experience with virgin soils leads us to raise the question. While it is entirely possible for the farm soils of today to have as great a quantity of organic matter and the necessary mineral nutrients as virgin soils, attention must be given to differences which may exist between the character of the organic matter and the form of inorganic materials in virgin soils, as compared with the cultivated soils of today. In other words, it is imperative to consider the quantity and kind of organic matter, and the quantity and kind of commercial fertilizers added to the soil, as well as the time and method of application.

The Use of Stable Manure

One of the best forms of organic matter to add to soils is stable manure. The beneficial effects of a single application of manure have been known to persist for more than 50 years. Manure contains many beneficial micro-organisms which multiply in the soil. In addition, it stimulates the growth and reproduction of those micro-organisms pre-existing in the soil, since it serves as a food material for these lower forms of plant life as well as those of a higher order. It must be remembered, however, that stable manue is, at best, an unbalanced fertilizer, with nitrogen the predominating element. Moreover, it stimulates those soil organisms which have to do with the fixation of atmospheric nitrogen, so that an application of manure may serve both as a direct and as an indirect source of soil nitrogen. This is a point that should be given consideration when questions pertaining to tobacco fertilizers are raised.

Nitrogen favors the vegetative phase of plant growth, hence excessive quantities delay the proper ripening of tobacco. Unripe tobacco cannot be utilized to advantage in the manufacture of high quality cigars. Moreover, if there is a considerable delay in ripening, there is likewise a danger from frost; frosted plants do not cure nor ferment properly.

The addition of stable manure immediately before the young plants are transplanted, invariably leads to a deficiency of nitrogen, since the available supply is appropriated for a time by soil micro-organisms. This condition may be largely controlled by the addition of a nitrate fertilizer to the manure before it is applied to the field, or shortly after. The use of stable manure, therefore, may lead to a lack of nitrogen during the early stages of plant growth, and to an excess during the latter stages.

Our experience leads us to believe that there is no valid reason for the use of stable manure alone as a fertilizer for tobacco. The yield is consistently less, the quality inferior, and the plants are less resistant to the invasion of disease, as compared with plants which draw their sustenance from a soil receiving applications of properly reinforced manure or other desirable soil treatments. Good quali-

Havana Seedleaf tobacco is carefully harvested at the Pennsylvania Lock Haven Station.

ty tobacco has been obtained through the use of commercial fertilizers alone. Hence we recommend that manure be applied to the soil elsewhere in the rotation rather than directly to the tobacco crop, so that its maximum beneficial effects may be obtained and its injurious effects may be reduced to a minimum.

Plowing under legumes is another method practiced by Lancaster county tobacco growers, in order to supply organic matter and nitrogen to the soil. This practice has a place under any progressive system of agriculture. A measurable quantity of soil constituents are absorbed and utilized during the growth of the legumes; these become available to succeeding crops, after decomposition has taken place. The practice of plowing under stable manure and legumes, which is so prevalent among tobacco growers, and the high nitrogen content of the tobacco crop, lead us to believe that the Lancaster county soils are relatively high in nitrogen.

What has been said does not necessarily minimize the importance of nitrogen in the growth of the tobacco plant. No plant food can compare with nitrogen in its desirable effects on growth and quality; this is known to all who are concerned with this particular crop. No one would recommend nitrogen alone as a tobacco fertilizer; and no one would recommend a fertilizer lacking in nitrogen. A proper balancing of all nutrients is necessary.

The Use of Lime

A soil deficient in lime is not usually a very fertile soil. The general tendency is for a soil to lose considerable quantities of this material after being placed under cultivation. If the lime content is not maintained within certain limits, maximum crop production cannot be obtained. The rational use of lime, therefore, is to be recommended.

Lancaster soils are of limestone origin and the lime content appears to be retained to a considerable degree against the forces of leaching. Some of these soils can be cropped for a long period without a lime application being necessary. If a soil is able to produce a good crop of legumes, lime is not a limiting factor. A soil, however, can have too much lime, so far as the tobacco crop is concerned. We believe that this is a factor that is

(*Turn to page* 50)

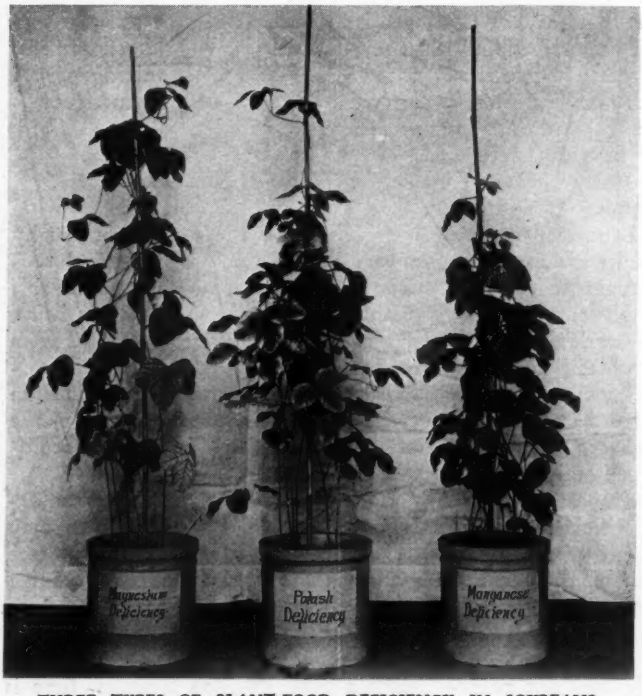
Some Deficiencies of Complete Fertilizers

By L. G. Willis

Soil Chemist, North Carolina State College of Agriculture

A COMPLETE fertilizer as defined by law is one which contains available nitrogen, phosphoric acid, and potash. No other component is given legal recognition, but the law is notoriously empirical in its definitions, and this one is no exception. Everyone conversant with the results of fertilizer investigations recognizes its inadequacy.

There is abundant evidence from various localities in the country to justify the conclusion that not only the three named ingredients but also sulphur, magnesium, calcium, and perhaps chlorine are valuable components of fertilizers. In the face of this evidence the only justification for the current interpretation of the term complete fertilizer is one of expediency to facilitate the analysis of the fertilizers in control laboratories.



THREE TYPES OF PLANT-FOOD DEFICIENCY IN SOYBEANS

Magnesium deficiency appears at the base of the plant, the leaves becoming chlorotic between the veins.

Potash deficiency produces a marginal chlorosis of the leaves.

Manganese deficiency is very similar to magnesium deficiency except that it appears at the top of the plant and the leaves do not shed.

The time is overdue when research agencies should scrutinize their data to see what has really been proved as to the use of fertilizers. Perhaps the greatest chance for fallacious conclusions lies in the assumption that superphosphate is valuable in fertilizers as a source of phosphoric

COTTON PLANTS FROM FIELD FERTILIZER EXPERIMENT

1, Concentrated fertilizer alone; 2, Concentrated fertilizer with 20 pounds of gypsum per acre; 3, Concentrated fertilizer with 40 pounds of gypsum per acre.

acid only. Probably everyone will agree that the contents of sulphur and calcium have values as plant foods, and yet when the results of experiments are assembled for interpretation, the conclusions are almost invariably drawn as though the phosphoric acid were the only valuable ingredient. This attitude is taken in spite of the well-known fact that for many crop plants sulphur is as important a plant food as is phosphorus and that sulphates are readily lost from soils by leaching, whereas the phosphates are not.

Many observant investigators of fertilizer problems have learned to distinguish between the brassy appearance of plants grown with an insufficient supply of sulphur and the deep, blue-green color that develops in plants fertilized with compounds containing sulphur. No one can question the value of sulphur, especially for the legumes and cruciferous crops, and the response of these on many soils to fertilization with superphosphate may be in part due to the sulphur content of the fertilizer.

The Role of Calcium

The calcium content of fertilizers in general and of superphosphate in particular is of less certain value. Only a few instances have been noted in which the calcium supply in the soil has not been adequate for normal plant growth. There is, however, some evidence that the calcium content of fertilizers is important aside from its value as a plant food. When, for example, the fertilizer contains organic nitrogen, this is promptly converted into free ammonia in the soil unless the fertilizer also contains a calcium salt which will neutralize the ammonia. Free ammonia is very injurious to many plants.

On the other hand there is a possibility that the present high concentration of calcium salts in fertilizers is not always desirable. The use of superphosphate on the muck soils of eastern North Carolina has resulted in decreased yields of corn, and experiments during the summer of 1930 indicate that at least a part of this unfavorable effect can be attributed to the calcium content of the fertilizer.

These two properties of calcium salts would seem to enhance or detract from the efficiency of superphosphate quite independently of the value of the actual content of phosphoric acid itself.

The Need for Magnesium

The need of many soils for magnesium has been widely observed and there can be no doubt that this element is a valuable component of fertilizers. Magnesium deficiency ex-

hibits distinct symptoms in tobacco, cotton, soybeans, and corn which can generally be recognized by persons familiar with the condition.

The fact that magnesium deficiency has not become one of the major soil deficiencies on some of the lighter soil types may easily be due to the unintentional inclusion of this important plant food element through the use of crude potash salts.

Magnesium deficiency for tobacco is commonly observed in the southeastern States and dolomitic limestone is extensively used as a source of magnesium for its correction. This is in reality a method of fertilization, and it must always be differentiated from the ordinary practice of liming. On the other hand the response to liming when dolomitic limestone is used cannot be attributed entirely to the neutralization of soil acidity unless it is certain that no benefit has been derived from the added magnesium serving as a plant food.

Insufficient Data

The southeastern States use more fertilizers than the rest of the country combined. This is not a boast nor a criticism, only a statement of fact, and the underlying reason is the extreme deficiency in the natural supplies of plant-food elements of the soils on which the fertilizer is used.

Under such conditions it would be a matter for surprise if only three of the seven or more essential mineral elements were naturally lacking, and the surprises of nature are directly related to a lack of human knowledge.

An immense amount of effort has gone into the study of soil fertility problems in this area. Most of it has been expended in the study of problems of current practical importance, and the methods have been largely empirical. There can be no doubt of the value of the results as they concern their immediate objectives. It is in their application to changed fertilizer practices that erroneous conclusions may be drawn.

A few examples of the inadequacy of the data we have might be given:

If 600 pounds per acre of a 4-8-4 fertilizer composed of superphosphate, nitrate of soda, and muriate of potash are found to give the most satisfactory returns with cotton on Norfolk sandy loam, what returns could be expected from equal amounts of plant food from ammonium phosphate, ammonium nitrate, and muriate of potash?

There is no correct answer because we do not know to what extent the calcium and sulphur content of the

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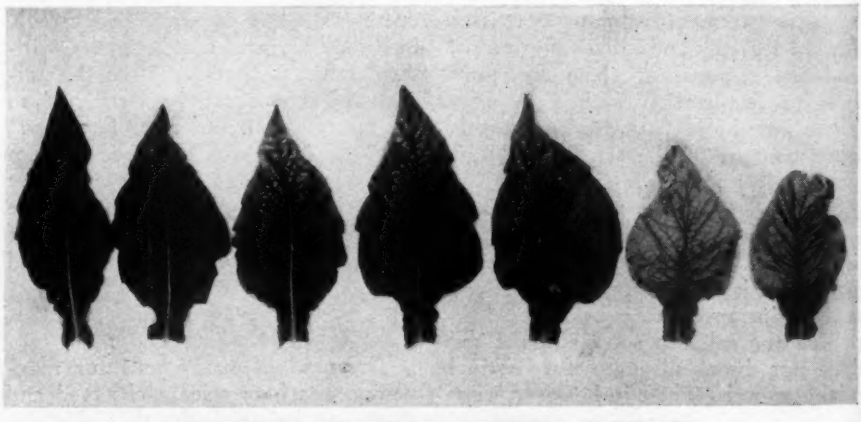

SAND DROWN OR MAGNESIUM DEFICIENCY OF TOBACCO

The leaves are arranged from left to right from the top to the bottom of the plant. Sulphate of potash-magnesia is an effective remedy for this condition.

This is the way potatoes turn out on the farm of Ray C. Prescott, Island Falls, Aroostook county, Maine—a yield of 464 bushels per acre. Note the even size and excellent type. Liberal uses of certified seed, clover plowed under, 2,200 pounds of 5-7-10 fertilizer per acre, and dusting and good care did this.

Intelligence and Potatoes

By R. F. Thomas

Houlton, Maine

A SIX-YEAR average per-acre yield of 420 bushels of potatoes does not "just happen." It is the result of a combination of approved practices.

The plowing under of big crops of clover, the planting of liberal amounts of high-grade certified seed, heavy application of high-analysis fertilizer, and thorough dusting are some of the practices that have made it possible for Ray C. Prescott, prominent potato producer of Island Falls, Aroostock county, Maine, to attain a six-year average per-acre total yield of 420 bushels of potatoes. In 1930 from 47 acres, including 5 acres of tuber-unit seed plots, he harvested 23,001 bushels, which is an average per-acre yield of 489.3 bushels. On one 12-acre field, he dug 7,203 bushels, an average of 600 bushels per acre.

It is the unanimous opinion of agricultural workers that Mr. Prescott is the most outstanding, all-around potato producer in this section of the country. He and his brother John, who farms on an adjoining farm, have been practicing these approved methods for several years and are now reaping their rewards.

Ray specializes in the growing of high-grade Spaulding Rose and Irish Cobbler seed potatoes for Florida and local trade and plants about 50 acres a year. John, although a smaller grower, produces excellent seed of the same varieties for the same trade.

Mr. Prescott, for a long time, has

During the latter part of the growing season, the field is a solid mass of tops.

recognized that soil filled with humus is very essential in producing big yields of well-shaped tubers and has relied upon peavine or mammoth red clover to furnish this. In 1930 a clover crop that would go better than three tons of cured hay to the acre was mowed the last of June and left on the ground until the aftermath grew up through, when both were plowed under the first of August, for next year's potato crop.

This land was immediately disced and again plowed around the middle of October. It is planned to plow once more before planting. The reason for so many plowings is to promote decay of the heavy crop of clover turned under and distribute it thoroughly throughout the soil so as to reduce to a minimum the danger in interfering with the capillary rise of moisture to the plants. When seedbeds are prepared, they are deep and mellow and remain that way throughout the season. The soil doesn't bake. Tubers have a real chance to develop normally. The soil looks as if it had "life," due to the abundance of decaying organic matter.

Mr. Prescott tests his soil for acidity and applies lime when and where needed. He applies about 400 pounds per acre of ordinary potato fertilizer to the acre when seeding down so as to insure a good crop of clover.

His rotation has been potatoes, potatoes, barley, and clover. From now on it will be potatoes, barley, clover, potatoes, and he is going to try seeding clover alone on some fields because he has no use or market for the grain. He also wishes to minimize the danger of intensifying diseases by avoiding following potatoes with potatoes two years in succession on the same piece of ground.

Is Sure of Good Seed

Belief that the foundation for high, per-acre yields of quality potatoes lies in the development of a high-yielding strain of as disease-free stock as is possible to grow, has led him to plant five acres of tuber-unit seed plots each year. These are isolated from the other fields and planted on clover sod and are constantly under his supervision throughout the season. On most farms the seed plot usually is planted after the general crop is put in, but this is not so on the Prescott farm. The seed plots are the first planted, and in 1930 were in by May 6.

Mr. Prescott's object in planting these plots early and first is to get the plants grown to the stage where diseased plants can be distinguished and pulled up and the remainder inspected again several times before plant lice, which transmit virus diseases, appear. Everything that looks abnormal comes out. The plots are inspected for diseases 20 times during the growing season, and the majority of the inspections are made before lice appear. It is not uncommon for eight different men, capable of identifying potato diseases, to inspect all of the plants in the plots. When dug, a man capable of telling spindle tuber, or anything else, follows the digger and picks them out. The three-year average yield of the tuber-unit plots is 360 bushels, a high yield when the small number of hills grown per acre is considered.

Only tubers having good size and excellent type are used in the foundation fields, and only those meeting his requirements as to measurements, type, and weight are used in the tuber-unit plots. He estimates that his yield has increased an average of about 27 bushels a year due to tuber-unit seed plot work.

Small quantities of manure have been applied, but Mr. Prescott relies almost wholly on commercial fertilizer to grow the crop. Up to last year a ton of 5-8-7 to the acre, was applied. Due to a demonstration on his brother John's farm in 1929, with 7 and 10 per cent potash in the fertilizer, in which more stocky plants and 108 bushels more potatoes per acre in favor of the 10 per cent were produced, he used all 5-7-10 in 1930 at the rate of 2,200 pounds per acre. He was so well satisfied that he will apply all 7-10-14 in 1931.

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Left: Ray C. Prescott examines the soil to see that it is light and fluffy and contains plenty of humus.

Right: A close-up picture, with the soil scraped away, shows a mat of decaying clover.

The Inquiring Mind *and the* Seeing Eye

By Dr. A. S. Alexander

University of Wisconsin

"THE thing can't be did!" said the neighbors to J. H. Hale, when he proposed a great new undertaking in fruit-farming; but there was no such word as "can't" in his vocabulary. He *did* what he set out to do!

The indomitable will to do things characterized the life-work of this man, who as a small boy in 1866, began growing small fruits on one-eighth of an acre and peddled the product from a rickety, little push-cart. By 1895 he had acquired 1,000 acres of orchard land, had come to be called the "Peach King," and marketed his fruit with a line of trolley cars of his own.

A Humble Beginning

John Howard Hale was born in South Glastonbury, Connecticut, November 25, 1853, and was destined to become the leading orchardist of his day. He never knew the love and guidance of a father, for the head of the house died when John was but two years old. His early life was spent on a mortgaged farm with his mother, two sisters, and a younger brother. Their's was a stern, uphill pull in those early years. There was much work to do, and little time for schooling. John left the district school when but 11 years old and, tall, slender, wiry lad that he was, became the mainstay of his mother. Intensely, he loved the land, nature, farming and gardening, but fruit trees were his chief delight.

One day, when husking corn on a neighbor's Connecticut hill farm, he spied a seedling peach tree growing in

JOHN HOWARD HALE

the fence-row and forthwith sampled its rosy-cheeked fruit. As the sweet juice ran down his chin, inspiring thoughts came to him and he speculated thus: "Seeing this seedling has done so well, maybe I could make a success of peach-growing in these rocky hills of old Connecticut? Anyhow, I'm going to try," and thereupon began saving his hard-earned pennies to buy foundation trees for a trial orchard.

The "do or die" spirit carried the far-seeing, shrewd, thrifty Yankee boy through his adventure, and, in

1869 he proudly and lovingly set out his first 200 trees. Three years later, according to a record quoted by *The Field, Illustrated,* he had increased his orchard to 3,000 trees and kept on expanding his operations, as means allowed, until in 1890 he owned 10,000 peach trees. By this time he had also put New England on the map as a peach-producing country, and had gained a reputation for honesty in marketing. That principle became a dominating attribute and purpose with him, and accounted, in large measure, for his success in life.

U. C. Top; U. C. All

Splendid traits of character had been inculcated in John, his brother, and sisters, by their devoted, widowed mother, and of these, strict integrity was paramount. Early, he determined that no buyer ever should be able truthfully to say that a package of fruit purchased from him was short in measure or poor in quality. When harvesting apples, for example, only mature specimens were taken from the tree at each picking, and it was a month or more before all were gathered from any one tree. The prevailing plan in his day was to pluck all at one time, and ship ripe, half-ripe, and green all together.

The Hales decided that honesty in marketing would insure success, therefore, they adopted the slogan "U. C. Top; U. C. All"—meaning that the fine fruits were not all on top, for show in basket or box, but that the entire contents were of equal quality.

That admirable idea, rigorously adhered to, quickly brought reputation, fame and fortune. Later the famous "RED LABEL" on the cars of the nightly express train that carried his peaches from Atlanta, Georgia, to Boston and other New England centers became recognized as a trademark guaranteeing supreme quality of product. What an advance was that speeding, refrigerator-car train to the humble little pushcart of Hale's boyhood days!

At the beginning of his career the widow's son, on the hilly, rocky, mortgaged farm at Glastonbury had, in addition to his historic pushcart, a shovel, hoe, and spade, no cash, no horses, no modern implements, but an inherent love and talent for fruit culture. He was a boy of farseeing vision who early chose his course and never swerved from it in later life. He had the *will*, and made the *way*. Nothing deterred him from his purpose, and in all that he did his brother was his able partner from boyhood until 1896.

Developed a Nursery

Their first strawberry patch of mixed varieties came from the old fruiting bed of a neighbor. At the age of 14 John hired out as a farm laborer to earn money to buy more improved varieties of fruit plants and, incidentally, to learn the art of marketing. Neighbors, it is said, warned their mother against letting the boys "take the best part of the farm for a brier patch." Fighting quack grass in a season of drought taught the boys that thorough cultivation was the next best

The Connecticut home of J. H. Hale.

thing to irrigation for fruit. Marketing experience taught them that neat packages and honest presentation of products insured profits. Then the importance of fertilization appealed, and led to study of the subject. Chemicals soon proved the "salvation of horticulture." Testing new varieties of fruit also occupied their attention and brought profits. A great nursery business eventually developed from the demand for plants and trees of some of the fine fruits the Hales offered on the market.

Purchased More Land

In the spring of 1896, a farm adjoining the original Hale homestead was acquired. The house on it had been built by Grandfather Hale 100 years before and was ample for the family. The additional acres furnished a broader field of labor. On it and the old farm, the nursery business was continued. A larger area was planted to small fruits, and these, stimulated by an abundant flow of water from a new irrigating plant, made splendid progress. Enlarged experimental grounds were established, and included test plots for 60 varieties of strawberries which attracted many visitors in the fruiting season of 1897. An extensive orchard of Japan plums was next formed, and the six approved varieties planted included the Hale Plum, which became famous for its prolificacy, beauty, and quality. Over 3,000 peach trees, added to the already large orchards, completed the onward march of horticultural progress on the home farm.

But the Hales were not yet satisfied. In another Connecticut county two adjoining farms were purchased, fences and walls removed, and 100 acres in a solid block plowed and planted to thousands of additional trees, plants, and vines, as a further proof of their faith in fruit-growing as a most enjoyable and profitable branch of soil culture. Three hundred acres in all around Glastonbury and Seymour were planted to orchard trees.

Most men would have thought these investments a sufficient venture; but not the enterprising Hales. In 1890, 1,800 acres of fruit land had been bought near Fort Valley, Georgia, from the profits earned on the northern home acres. About 100,000 peach trees were set out on the new plantation, which in time grew to an orchard of 200,000 trees, of which 90,000 were in full-bearing at one time. Fifteen hundred acres were devoted to orchard and 300 acres prepared for planting, six varieties of peaches were grown, there being 20,000 bearing Elberta trees, 10,000 bearing trees each of Greensboro, Waddell, Highly, and Bell of Georgia varieties, and 5,000 bearing Carman trees.

In 1912, 151 carloads of peaches were marketed in New York, Philadelphia, Boston, Baltimore, and other leading Eastern cities. The total shipment of fruit aggregated 76,104 crates, containing 456,624 four-quart baskets of the finest quality peaches. "That year the Georgia peach crop returned a net profit of 85 cents per basket to the grower. The Hale crop netted more than $1 clear, per basket." (*The Field, Illustrated.*) Some of the best trees yielded as high as 10 crates in a single year. A mature tree should produce at least one crate per season.

Fertilized His Soil

To obtain his fine results, Mr. Hale always fertilized the soil each year. He got good results from a mixture of 600 pounds of muriate of potash and 1,400 pounds of a phosphate fertilizer. Ground bone and Thomas slag entered into the home-made combination. Barnyard manure was used to fertilize young trees, but was not found satisfactory for mature fruit trees.

The enterprising orchardist was ever experimenting and devising new short cuts and better methods. Usually, he had to solve his own problems, for in his day the experiment stations had

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The corn went down badly on the plots which were not fertilized.

Proving an Idea

By L. C. Brown

Farmer, Genoa, Illinois

I HAVE found the advantages in fertilizing corn to be fourfold:

1. Rapid early growth enabling earlier cultivation with power cultivators and greater control of weeds.
2. Higher yield.
3. Improved quality, feeding and market value.
4. More strength to the stalks, which means that the fertilized corn stands up better and more corn is saved when using a corn picker.

A few years ago I began the use of limestone. On some fields two tons of limestone per acre failed to grow clover, and on these fields I increased the application to six tons per acre. I then secured good stands of clover, but the growth was short and stunted. This led me to believe that I had a shortage of plant foods in addition to a need for lime. The soil type is brown silt loam.

In 1929 I began fertilizing corn using 125 pounds of 4-16-4 per acre, hill-dropped. This treatment increased my yields an average of 9 bushels per acre. I tried four different fertilizers on small plots to determine the best one under my conditions, using 0-12-12, 4-16-4, 0-14-6, and 0-20-0. The 0-12-12 and the 4-16-4 gave the best increases, each giving an increase of 14 bushels per acre over the check.

In 1930 I fertilized 200 acres of corn using 0-16-6 following clover and 4-16-4 on other corn land. These fertilizers were hill-dropped at the rate of 125 pounds per acre. My average yield this year was 50 bushels per acre. Before I began liming and

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Proper Fertilization *Makes Minnesota Peats* Produce

By E. C. Torrey

Former Publicity Specialist, Minnesota Extension Service

APPLICATIONS of commercial fertilizers to peat land plots in Wadena county, western Minnesota, in 1930, increased the yield of clover-timothy hay at the rate of about 1½ tons to the acre.

Flax sown on a plot treated with 250 pounds of potash responded with a yield at the rate of 23.76 bushels to the acre, while the unfertilized plot yielded at the rate of only 17.29 bushels. A variety of barley known as Peatland averaged about 33 bushels to the acre on the fertilized tracts. Where no fertilizer was used, the yield was at the rate of 18.90 bushels to the acre.

All the root crops responded better to heavy applications of fertilizer than did hay or grain. Carrots on fertilized peat yielded at the rate of 15.7 tons to the acre. Without fertilizer the yield was at the rate of only 4.22 tons per acre. Many potato growers reported outstanding yields on fertilized peat. Cabbage was a good crop when properly fertilized, but yield tests were not taken.

Reed canary grass, spurred by commercial fertilization, yielded two tons to the acre the same season it was sown. Give this perennial forage another season's growth under normal conditions and it will yield three to four tons to the acre. Oats were seeded too late and were badly damaged by rust.

Wadena county has a large acreage of peat land, and two seasons of drought in succession have aroused increased interest in its development, says Carroll Blakeslee, county agent. Late in the season of 1929 it was decided to make this development a major extension project for the year 1930. Accordingly, several acres of peat were plowed and a seedbed prepared in the fall of 1929. The plan called for the growing of clover-

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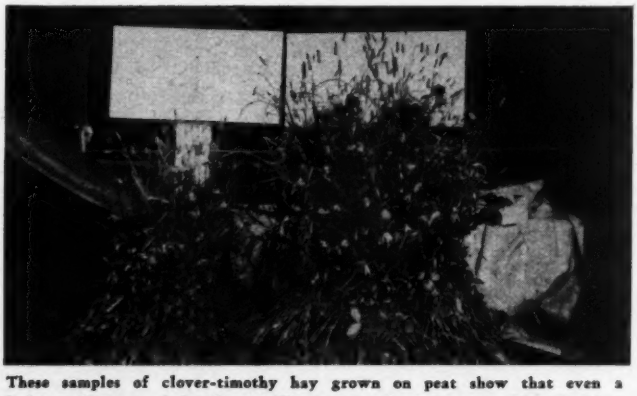


These samples of clover-timothy hay grown on peat show that even a light application of fertilizer will give greatly increased yields the first year. Left: No fertilizer, yield 0.84 ton per acre. Right: Fertilized with 100 pounds of potash and 50 pounds of superphosphate, yield 2.12 tons per acre.

The fertilizer was applied to the gardens with an ordinary wheat drill.

Potash *in the* Garden

By E. C. Stair

Assistant Professor of Horticulture, Purdue University

EARLY in the spring of 1930 we decided to apply some potash to part of our student garden at Purdue University to determine the value of this plant food on vegetable crops in general. On the basis of 15 acres of the crops grown, and including all of those acres which showed a loss, there was still a profit of $7.73 for each $1 invested in potash.

The soil on which these fertilizer demonstrations were conducted as class exercises, is a sandy loam underlaid with gravel. The tract has been used for gardening purposes for the past eight years. At the beginning, the land was a rather thin piece of ordinary farm land. Since starting to develop the garden, the land has received a number of good coats of manure and some commercial fertilizer each year.

The garden had all been plowed in the fall of 1929. On March 13, 1930, twenty per cent superphosphate was added to the garden at the rate of 1,000 pounds per acre, which is accepted as a good commercial practice for market gardens. On the same day the east one-half of the garden received an application of muriate of potash at the rate of 500 pounds per acre. This was applied with an ordinary wheat drill as shown in the accompanying picture. The following day this fertilizer was thoroughly worked into the soil with a double disk and tractor. This was done about two weeks before any seeds were planted in the soil.

THESE CROPS RETURNED AN AVERAGE PROFIT OF $7.73 FOR EACH $1 INVESTED IN POTASH

CROP	Yield Per Acre $K_2O+P_2O_5$	Yield Per Acre P_2O_5 alone	Increase due to use of Potash	Selling Price	Increased Value due to use of Potash	Net Gain or loss due to use of Potash	Gain per dollar spent for Potash
Early Scarlet Globe Radish	1,586 doz. bunches	1,092 doz. bunches	494 doz. bunches	40c per dozen	$197.60	$182.60	$13.17
Earliest Scarlet Globe Radish	3,150 doz. bunches	1,946 doz. bunches	1,204 doz. bunches	"	481.60	466.60	32.10
Earliest Scarlet Globe Radish	1,605 doz. bunches	1,316 doz. bunches	289 doz. bunches	"	115.60	100.60	7.71
Rapid Red Radish	1,778 doz. bunches	1,624 doz. bunches	154 doz. bunches	"	61.60	49.60	4.11
Giant Butter Radish	434 doz. bunches	308 doz. bunches	26 doz. bunches	"	10.40	4.60*	.30*
Alaska Peas	1,560 lbs.	1,496 lbs.	64 lbs.	.07½ lb.	4.80	10.20*	.68*
Notts Excelsior Peas	1,968 lbs.	1,984 lbs.	−16 lbs.	.07½ lb.	15.00*	15.00*	1.08*
King of Denmark Spinach	2,480 lbs.	1,924 lbs.	556 lbs.	.03½ lb.	19.46	4.46	1.30
Head Lettuce	847 heads	559 heads	298 heads	1.00 doz.	25.00	10.00	1.67
Tomatoes	9,907 lbs.	7,593 lbs.	2,314 lbs.	.04 lb.	92.56	77.56	17.14
Stringless Greenpod Beans	3,923 lbs.	3,151 lbs.	772 lbs.	.02½ lb.	19.30	4.30	1.29
Beets	900 doz. bunches	636 doz. bunches	264 doz. bunches	.25 doz.	66.00	51.00	4.40
Eggplant	25,643	15,600	10,043	.75 doz.	627.75	612.75	41.85
Early Cabbage	12,659 lbs.	12,218 lbs.	440 lbs.	.02 lb.	8.80	−6.20*	.41*
Leaf Lettuce	3,300 lbs.	2,875 lbs.	425 lbs.	.05½ lb.	233.75	218.75	15.58

*Loss

All rows in the garden ran east and west. This gave equal lengths of all rows that were supplied with muriate of potash and phosphoric acid to compare with the other end of the garden to which only phosphoric acid had been added in addition to the manure which had been applied fairly uniformly over all parts of the garden. In addition, spinach, cabbage, head lettuce, and leaf lettuce were given from one to three side-dressings of nitrate of soda at about 10-day intervals, or when they began to show need for nitrogen. When nitrogen was applied it was applied to both ends of the row alike.

The figures in the table opposite show only the results obtained from the use of potash. The value of the potash used was $15.00 per acre. All figures given are arranged on the acre basis for each crop.

A Profitable Investment

In studying the results of this table it may be seen that some crops responded much more favorably to the use of potash than others, and as is shown in the case of radishes some varieties gave much better returns than others. One variety showed a loss. The radishes were all planted on one piece of ground which made the conditions very similar from the standpoint of soil. The radishes also seemed to be at about the same stage of maturity and were all harvested on the same day.

An interesting thing noted with regard to the head lettuce was the quality produced and the rate at which it matured. The harvest extended over a period of 10 days. On the plot which received the potash, 72 per cent of the heads were harvested during the first four days of the harvest period. These heads grew and matured quickly; they were tender, sweet, and of very good quality. On the plot receiving phosphoric acid alone 65 per cent of the heads harvested were cut during the last four days of the 10-day period. These heads matured slowly and were tough, bitter, and of poor quality.

This entire garden raised two crops this year with the exception of the strip planted to eggplant. Part of the crops listed in the table are from the first planting and the remainder were from the second planting. The tomatoes were the second crop raised on the same plot where the radishes were grown as the first crop. The tomatoes were pruned to one stalk and trained to stakes.

The stringless greenpod beans were from the early planting. Potash evidently produced a fairly large increase in the yield of this crop without any additional nitrogen other than that from manure. While the beans were growing and before the crop was completely harvested, a very decided difference was noted in the color of the foliage. The foliage on the plot receiving no potash was dark green while that on the plot receiving potash had a decided yellowish color quite similar to that produced by nitrogen deficiency. This would seem to indicate that more nitrogen might have increased the benefit from the potash on the crop.

According to results secured from this first year's work, it seems that potash is especially important on root crops and on some other crops such as eggplant, lettuce, and tomatoes.

On the basis of 15 acres of crops as listed in the table, and including all of those acres which showed a loss, there was still a profit of $7.73 for each dollar invested in potash. This was based on the prices listed in the table in the column marked "selling price." These were all wholesale prices and were low.

Many crops were benefited by liberal applications of potash, but the maximum increase apparently was not obtained without the proper amounts of nitrogen and phosphorous to balance the ratio.

Lespedeza seed is harvested in Stanly county, North Carolina, with a seed pan arrangement such as this.

A County Rebuilt

By F. H. Jeter

Editor, North Carolina State College of Agriculture

SINCE the time a very plausible gentleman sold me for $50 a history of North Carolina entitled, "Rebuilding an Ancient Commonwealth," in which he intimated that my share in rebuilding the State would be commented upon at length, I have been somewhat shy of anything having to do with rebuilding. The history in question contained two volumes of very mediocre history and two volumes of scintillating autobiography. I say "autobiography" because the material was very largely furnished by the subjects themselves and anyone having $50 could have his unusual accomplishments commented upon. If he had $85 he could have a picture included. I suspect he could have been nominated for Governor for the other $15.

The history was designed to give posterity an account of the work done by men of mark in North Carolina during this past few years of progress. The only trouble was, the promoters left out the word "easy."

But there is a historical accomplishment in this ancient commonwealth about which posterity should be informed. Among the 200 or more newspapers coming to this office in the course of a week, there is the *Stanly News and Press*. A modest newspaper telling about the doings of good people in a good county. It records their goings and comings and dwells more than do most papers on the affairs of rural people. Appearing in bold relief on one of the pages of this paper recently was a full-page advertisement prepared for the busi-

ness men of the county endorsing the work of county agent O. H. Phillips.

The advertisement declared that this extension worker was responsible for the great progress made in the county during that 10-year period in which he had served it. It was also said that the county had made more agricultural progress than any other North Carolina county during this period. Thirty-five business firms contributed to the advertisement.

This is something unique in extension work. Of course, when fights are made on county agent work, it is common for groups of farmers to appear before the county boards to seek a continuance; but, there was no fight on Mr. Phillips. These firms had seen the good things accomplished and wished to add a word of appreciation.

What Was Accomplished?

Perhaps, therefore, it would be interesting to go back a few years and study Stanly county agriculture. The soil was poor and the people were poor. Probably here as nowhere else in North Carolina could one find accurate expression of the old adage that a fertile soil makes a prosperous people and an infertile soil produces a hopeless, disillusioned people. The soil was poor, nor is it yet naturally fertile. It is of the characteristic slaty composition found in two or three counties of that section and is hard to work, hard to improve, and hard on the souls of its owners.

Therefore, Mr. Phillips saw this condition and adopted soil improvement as his principal project. That was 10 years ago. Last fall the people of Stanly held a great banquet attended by some 400 farmers and farm women and a few invited guests. These folks were conscious of new power. They had the light of achievement on their faces. They had crossed the Alps, the Rubicon, and several other significant barriers, and no one could talk with them without feeling the radiant exultance of accomplishment.

And why? Because they have builded a new agriculture. Starting with lespedeza, that lowly legume said to have been left in the South by the scattered feed bags of a conquering host, the farmers are graduating into alfalfa, sweet clover, pastures, dairy cattle and a happy, prosperous farm life. Not graduating entirely, because lespedeza remains as the principal crop. On it, the other things have been built.

Perhaps there are 45 square miles of lespedeza being grown in Stanly county each year now. At least there were between 25,000 and 30,000 acres

Harvesting a two-ton crop of lespedeza hay. Farmers claim that it is an easy matter to cure lespedeza hay in a way that retains almost all of the leaves.

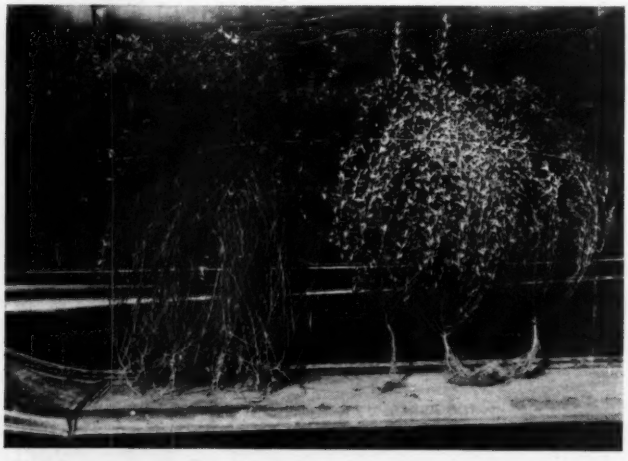
grown by some 1,200 farmers in 1930. The crop is being grown on over 95 per cent of the farms and it is planted for hay, pasture, and soil improvement. It is a million-dollar crop to Stanly county, says Mr. Phillips, and will increase the farming value of the soil from $20 to $30 an acre the first season.

Farmers Vouch for Lespedeza

Some of the claims appear to be extravagant, but the farmers themselves vouch for the fact that lespedeza has increased the average yield of corn from 20 bushels an acre in 1926 to 30 bushels in 1930. The increase with cotton, hay, and small grain has been in proportion, they say. Getting down to concrete figures, the men of this county say actual demonstrations have proven that a crop of lespedeza will increase the yield of corn 20 to 25 bushels an acre; wheat, 10 to 18 bushels; oats and barley, 10 to 30 bushels; and cotton 500 to 1,200 pounds of seed cotton an acre. It is an easy matter to produce 500 pounds of lint cotton an acre with a 300-pound application of a 12-4-4 fertilizer after a crop of lespedeza if the boll-weevil is not permitted to become too active.

Travel over the county and interview the farmers. The testimonials in favor of lespedeza will read like a patent medicine advertisement. The farmers have formed the Stanly County Mutual Exchange which is a co-operative, non-profit, seed-growers' and soil-improvement association. This association is banded together to improve the soils of the farmer members and to sell the surplus lespedeza seed that may not be needed for the next season. Each season the Exchange issues a small booklet telling about the virtues of the crop and some of the results secured from it and giving specific facts about how to plant, cultivate, and harvest.

An extract from the current publication says, "Lespedeza will make profitable growth without lime or fertilizer, but will respond to an application of 1,000 pounds of ground limestone an acre applied each two or three years. It will also respond to an application of 200 or 300 pounds per acre of a fertilizer analyzing 2 to 3 per cent nitrogen, 12 to 16 per cent phosphoric acid, and 4 to 8 per cent potash. This should be applied when the small grain is seeded or when lespedeza is seeded in January or February."



The lespedeza on the right illustrates its habit of growth when sown very thickly. That on the left shows its general habit of growth. Note the fine stems and the immense branching.

It must be kept in mind that lespedeza is generally planted on the small grain in late winter but will do almost as well when sown alone. There are four popular varieties, including the Common, Tennessee 76, Kobe, and Korean. Stanly farmers use the Common almost exclusively. Its fine stems are heavily loaded with leaves and its dense

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These Wealthy apple trees, shown here in full bloom on May 18, 1930, were fertilized with 6 pounds of nitrate of soda, 5 pounds of superphosphate, and 1 pound of muriate of potash per tree. (Fertilizer experiment, Abbotsford, Quebec.

Complete Fertilizers *for* Apple Trees

By F. S. Browne

Assistant to Superintendent, Dominion Experimental Station, Lennoxville, Quebec

DURING the past 10 or 12 years, the practice of using a nitrogenous fertilizer only, in apple orchards, has become quite general in Eastern Canada and the New England States. In many instances the response to this treatment has been remarkable, the value of the increase in crop being many times that of the fertilizer used.

Investigators have become converted to the idea, as a result of field experiments during the period. Following their recommendations, the practice, as would be expected, has spread with even greater rapidity.

The general realization of the value of nitrogen, in fruit bud formation, has also played an important part in popularizing the nitrogen-alone program. By many it is believed that a liberal supply of nitrogen in the soil during the early part of the season will be drawn upon by apple trees, and when assimilated, will induce the formation of fruit buds. These under favorable conditions will blossom and probably set fruit the following year. Accordingly, if more fruit is wanted, apply more nitrogen, and so on "ad infinitum."

While the fact that apple trees require phosphorus and potassium as well as nitrogen is admitted, it is assumed by the nitrogen-only expon-

ents that a sufficient quantity of these minerals will be rendered available, as required, from the large stores known to exist in our northern orchard soils. There is now, however, considerable evidence available to show that this assumption is lacking in accuracy and that the nitrogen-alone program has been carried far enough.

Matter of Balance

In this connection it should be recalled that previous to 1914 fertility was maintained in orchard soils in much the same way as in soils used for field crops. The most commonly used fertilizer was barnyard manure, and where commercial fertilizers were used, the old 4-8-4 was the favorite. The chief variation was in the use of basic slag or a combination of potassic and phosphatic fertilizers as a supplement to manure. Now, as apple trees require less phosphoric acid and potash and relatively larger amounts of nitrogen than farm crops, the limiting factor in this system of fertilizing was nitrogen. Also, since phosphoric acid and potash are practically non-leaching, and about the only way they can be removed from the soil is by means of plant roots, a large reserve of these essential minerals must have been built up in many orchard soils. Accordingly, when nitrogen was applied, a correct balance was obtained and greater production resulted.

The trees, however, were still using phosphoric acid and potash in even larger quantities than formerly, as nitrogen had ceased to be the limiting factor. This condition has prevailed for some time, and additions have not been made to the reserve of phosphoric acid and potash. It is, therefore, probable that reserve of these essentials is becoming depleted and that the amounts rendered available, from the natural store in the soil, are too small to balance the large quantities of nitrogen usually applied. It is, accordingly, possible that minerals may, or shortly will, become the limiting factor. From the evidence available, it would seem that such is the case in many places.

Respond to Complete Fertilizers

During the past three or four years, individual growers here and there over Eastern Canada and the New England States have found that their trees were not making a satisfactory response to nitrogen only, and a few have begun using complete fertilizers with good results.

This picture was taken on August 20, 1930, and looks down the center of the block of Fameuse apple trees used in the fertilizer experiment at Abbotsford, Quebec.

In a cooperative experiment conducted by the Dominion Experimental Farms in the orchard of Mr. A. W. Buzzell at Abbotsford, Quebec, under the supervision of the writer, complete fertilizers have proven superior to nitrogen only, with the varieties Wealthy and Fameuse. The soil on the area chosen was very

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The Rainbow's End

By Charles Kilpatrick

Fort Smith, Arkansas

NOT only is Oklahoma young as a State, but the use of commercial fertilizers is still more or less new to her farmers. The fertilizer manufacturers in the past have termed it "border territory." Now the judicial use of commercial fertilizer is listed as one of the major items in Oklahoma's soil reclamation program.

Pioneers and homesteaders who made the race to stake "free claims" given by the government, routing the prairie dog, clearing the land, and breaking the sod, were impressed with the rich virgin soils. Land agents advertised Oklahoma as the "Land of Plenty," as the "Field at the End of the Rainbow." Agricultural workers talked of the bounteous fertility of the soil. Crop yields were high. But there came a day of disappointment to the farmers. Crop yields grew smaller and smaller. Old fields were abandoned. New land was cleared. The soil's power to produce failed because of the continuous leaching and washing away of the organic matter and available plant food. Terracing, legumes, and pure seed were introduced by agricultural leaders, and marked strides have been made along this line.

Leading farmers, particularly the potato growers, have taken hold of the fertilizer problem with a great deal of interest. They are anxious to spend their money to get the most out of it, but as in all new fertilizer sections, the farmers bought on ton prices rather than on plant food requirements. However, during the past two or three years numerous tests have been made by leading growers to improve the grade of the fertilizer and find the most economical rate of application.

Mr. John Brown of Muskogee, Oklahoma, who last year averaged 300 bushels of No. 1 potatoes per acre on 88 acres, fertilized with 450 pounds of the 4-8-10 mixture per acre, gives his experience as follows:

"For several years I have grown potatoes very extensively, experimenting with various fertilizers, and my experience has been that a high content of potash is very essential and decidedly improves quality.

"I used one car 4-8-10 this year and my results were phenomenal, both as to yield and quality. My brokers in Chicago, Cincinnati, and Denver wired me, 'Your potatoes positively best arriving our markets.' My experience has taught me that a high content of potash produces better and smoother potatoes, better shippers, and more No. 1's, and returns several times the investment."

Over 200 tons of this 4-8-10 mixture was used in the State last year, mostly in an experimental way. So well pleased were the potato growers with this analysis that Mr. R. T. Payne, Vice-President and General Manager of the Oklahoma Potato Growers Exchange, mailed out the following letter to members, fertilizer dealers, and others interested in improving both yield and quality of potatoes:

"You will soon be buying your potato and truck fertilizer. Many growers have used fertilizer with decided success, both as to increased yields and a superior quality product. Others have been disappointed. In many of these cases, it has been because of buying low grade fertilizer.

"For your information we are giving you results of demonstrations made by leading potato growers in this section last year as to the proper analysis to use.

"The increase from the extra potash, at a nominal cost per acre, more than paid the whole fertilizer bill. Our observation has convinced us that a fertilizer with high potash content adds to the yield as well as the carrying quality of potatoes. It produces a healthy, vigorous plant that enables it to resist disease.

"Many of our leading growers in the State used the 4-8-10 mixture last year on their entire acreage with decided success. It costs about 20c per hundred more than the 4-8-6 mixture that has commonly been used in eastern Oklahoma, but these growers claim the 4-8-10 mixture was far superior to the 4-8-6 in increasing the yield and particularly the quality of the potato. Mr. C. Gamble, Garvin, Oklahoma, states, '$128.00 invested in extra potash returned me $1,750.00 gross income. My potatoes sold for 25c per hundred more than anybody else's in the county. I attribute this to the 10 per cent potash that I used. Out of 28 cars shipped I only had one complaint on one car because of potatoes going down in transit. In previous years while using lower potash, it was common to have 25 per cent damage in transit.'

"Our recommendation is that you use only certified seed or potatoes from fields on which you can obtain the field readings and a 4-8-10 fertilizer."

Mr. Gamble averaged 233.3 bushels No. 1's per acre on 50 acres fertilized with 800 pounds of a 4-8-10 mixture per acre. The unfertilized only averaged 77 bushels per acre.

Grower	1000 lbs. per A. 4-8-4 (N-P-K)	1000 lbs. per A. 4-8-8 (N-P-K)	1000 lbs. per A. 4-8-12 (N-P-K)
F. M. McRoberts	306 bu.	301 bu.	323 bu.
John Brown	311	350	354
Brooks Stephens	243	269	283
C. Gamble	256	274	290
Average Yields	279 bu. No. 1's	298.5 bu. No. 1's	312.5 bu. No. 1's
8% potash content gained over 4%		19.5 bu. No. 1's at cost of $2.00	
12% potash content gained over 4%		33.5 bu. No. 1's at cost of $4.00	

Years *of* Good Pasture

Top-dressing with Fertilizers Kept It Good.

By Ford S. Prince

Specialist in Soils and Crops, University of New Hampshire

A NEW ENGLAND pasture that will produce two tons of dry grass per acre, analyzing 18 per cent protein, is undoubtedly a good pasture.

According to figures secured by the New Hampshire Station in 1930, the pasture of Charles S. Phelps of Jaffrey made this record. It was not due to the weather, for this element was surely adverse; nor to accident; but to the fact that since 1910 Mr. Phelps has been using a top-dressing of fertilizer on his pasture annually.

To those of us who during the past two or three years have started experimenting with old pastures, it seemed rather odd that anyone should have considered this same matter 20 years ago. To have kept it up for two full decades seems rather more remarkable, for Mr. Phelps never has let a spring go by without returning some plant food to his pasture.

As soon as Mr. Phelps came to our attention, we lost no time in getting in touch with him, believing that through his experience and in his pasture we might learn much as to what continued pasture fertilization will do for the vegetation and for the cows.

Mr. Phelps we found to be a man well along in years, living in Jaffrey on the farm which his father had owned before him. Prior to 1910 for 25 years he had been working in Connecticut. While there, reports came to him about wonderful crops of grass hay being grown by George M. Clark at Higginham, Connecticut.

Feeling that the time was near when on account of failing eyesight he would be forced to return to the home farm, Mr. Phelps visited Mr. Clark to learn what he could about

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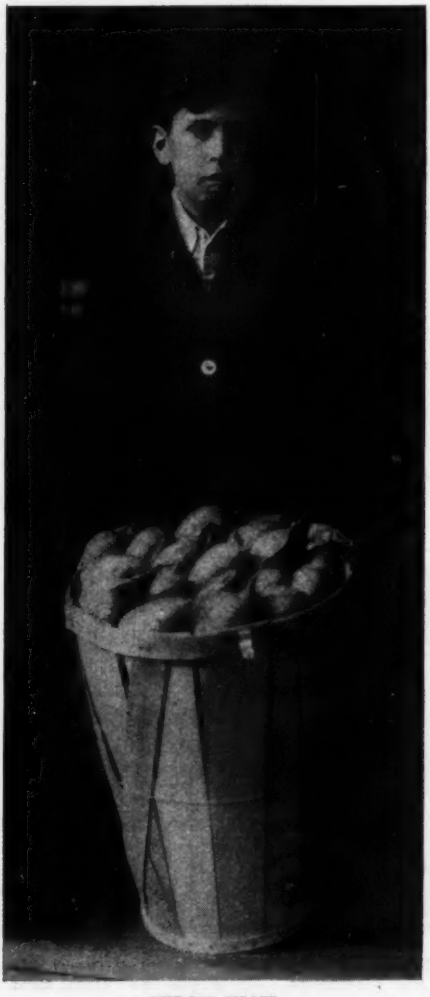
The pasture on the left received 600 pounds of an 8-16-16 fertilizer per acre; that on the right was unfertilized. The picture was taken three weeks after the complete fertilizer was applied.

Sweet Potatoes

And a Boy Who Knows How to Grow Them

By Amos Kirby

Mullica Hill, New Jersey



BYRON SHAW

BYRON SHAW of Swedesboro, New Jersey, is a successful 4-H club member. Last year he led his county on yield in the sweet potato club and established a new high State record with a production of 346 bushels per acre. His record attracted so much attention that he was invited down to Atlantic City in December to address the State Horticultural Society on his system of growing sweets.

This was Byron's first year in club work. He was only 11 years old, and the story of his success as a sweet potato grower is quite remarkable, when we consider that he followed the same general method of fertilization and cultivation that is followed in this famous area.

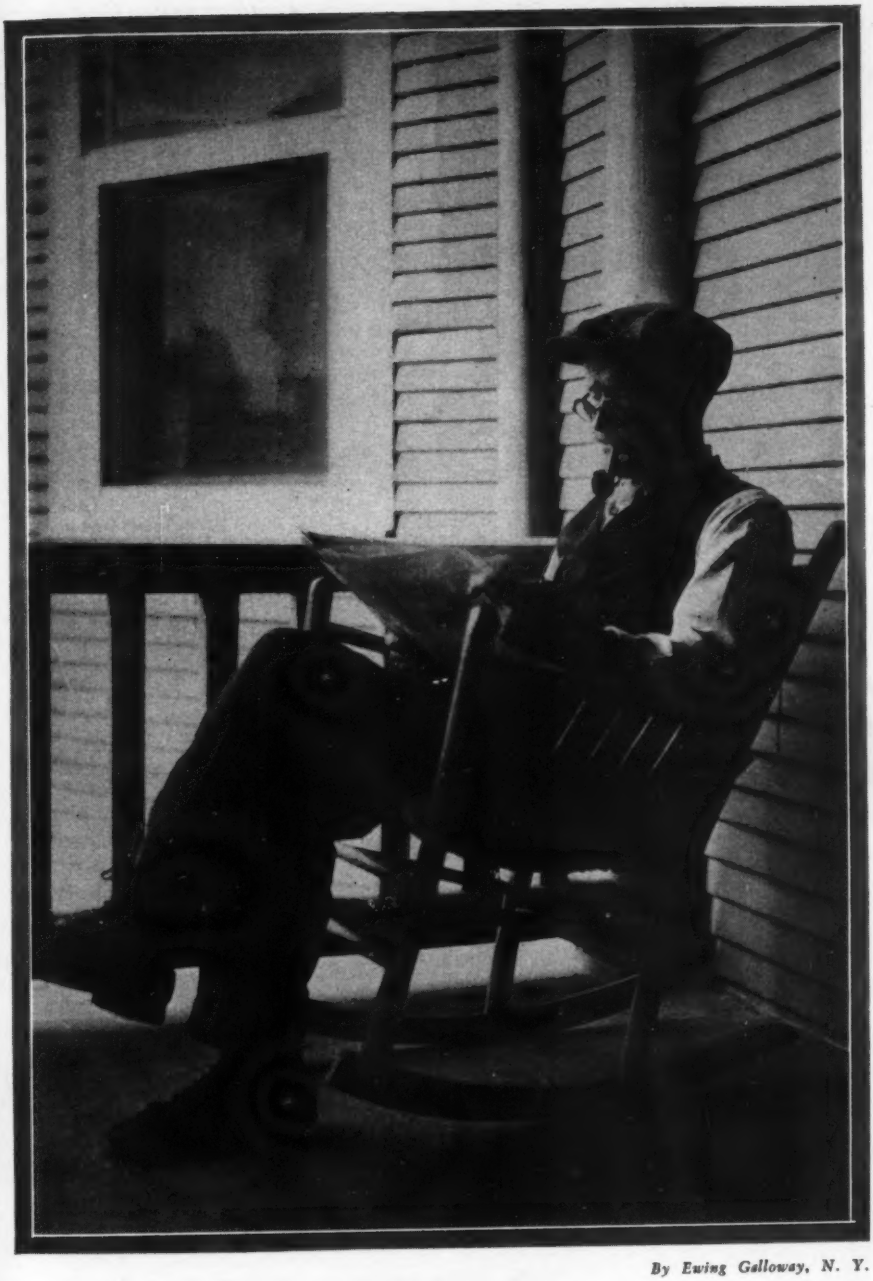
Byron is too small to do all of the work in connection with growing a crop of sweet potatoes, but he did help to grow his own plants, assist in preparing and cultivating the soil, digging the crop, and he attended to many of the detail operations that are necessary in the production of good sweet potatoes.

He Paid for His Help

Last spring when his father, Frank Shaw, was putting out his sweet potato beds, Byron took an active part in his club project by helping to get the soil ready for the plant beds. Later on when they were bedding the potatoes, he helped all day to place the seed. The plowing of the ground and the preparation of the soil for the sweet potatoes was done by a hired man, but his father charged him at regular rates for the time required to do these various tasks.

Byron's first big job came when it was time to put the plants in the field.

(*Turn to page* 42)



By Ewing Galloway, N. Y.

PICTORIAL

ARE YOU USING
FERTILIZE PASTURES FOR PROFIT
POTASH MAKES PASTURES PAY
INCREASE CLOVER IN YOUR PASTURE WITH PLENTY OF POTASH
INSURE REAL CLOVER IN YOUR PASTURE
POTASH PRODUCES QUALITY
GROW MORE QUALITY TOBACCO TO IMPROVE MARKETS
Use 3-5-12 TOBACCO

A FERTILIZER EXHIBIT AT THE RECENT PENN

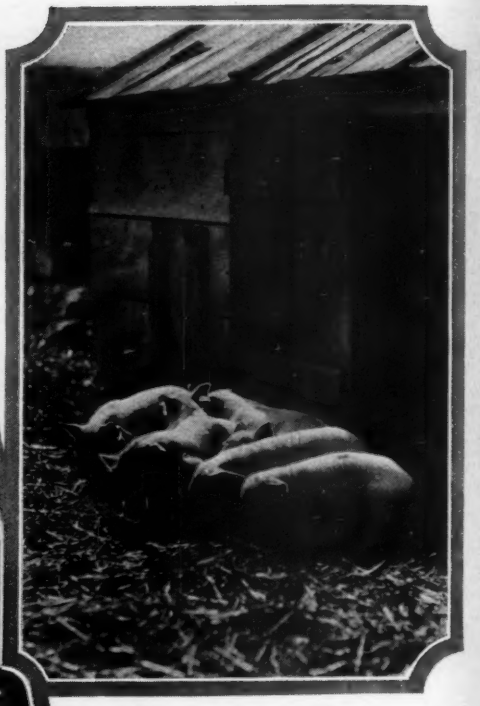
The potash exhibit at the Pennsylvania Farm Products Show held in able use of this plant food on pastures, potatoes, clover, and cigar leaf tob It is estimated that more than 300,000 farmers attended the show during was given to farmers visiting this booth.

POTASH EXPORT MY. INC.
AMSTERDAM HOLLAND
NOUGH POTASH TO PAY?
POTATOES Need Plenty of POTASH
POTASH IMPROVES POTATO Yields/Quality
MANY 400 BUSHEL CLUB MEMBERS FIND 487/488 ARE GOOD POTATO FERTILIZERS
Give Your Potatoes a Chance to Produce
Use 1200 lbs. per acre 4-8-7 or 4-8-8 Fertilizer
CLOVER is the "LIFE" of the Potato Rotation
Most 400 Bushel Club Yields Follow Legumes
Try Top-Dressing EARLY this Spring with an EXTRA bag of MURIATE of POTASH
OR
500 lbs. High Potash Potato Fertilizer
CORN STARVATION SYMPTOMS

ENNSYLVANIA FARM PRODUCTS SHOW

Show held in Harrisburg, Pennsylvania, Jan. 19-24, featured the profit-
igar af tobacco, four crops of special interest to Pennsylvania farmers.
show during the week. Information based on sound experimental data

Right: Early spring pigs enjoy and profit by getting out into the sunshine.



Left: The Barnyard Philosopher—there is one in every farm community.

Right: Celery cutting in Sanford county, Florida, where one-third of the nation's supply of celery is produced.

Left: This foursome are stepping out as though glad to get back into the harness.

Right: Two pretty farm girls inspect the fine lespedeza grown in Stanly county, North Carolina.

Left: With the rare instinct of a great artist, the photographer has caught this March plowman and his team in a minute's rest.

Probably the first fertilization of rice ever made by airplane was made on February 11 at Oroville, California. The plane, equipped with special machinery, demonstrated to local growers and agricultural experts the feasibility not only of sowing rice by airplane, but also of spreading the fertilizer. The method is as cheap or cheaper and quicker than any other. It gives even distribution of fertilizer while the rice land is under water; allows the material to go into solution quickly; saves time by not having to wait until the farmer could get onto the land; and aids the farmer in obtaining an earlier market. Left: County Agent Henry P. Everett of Oroville supervised the tests and inspected the distribution of material on the ground.

The Editors Talk

Another Frontier Vanishes

Among the frontiers that are fast vanishing is the fertilizer frontier. It was not so many years ago that a fertilizer salesman west of the Mississippi was out of his element, at least so far as profitable fertilizer sales were concerned. Now it is quite different. Not only is there an increasing interest in the profitable use of fertilizers in certain sections of nearly every State, but actual fertilizer tonnage is increasing rapidly in many States west of the Mississippi.

For instance in a group of some 15 States—from Minnesota to Idaho and south to Texas and New Mexico—total fertilizer sales since 1920 have increased from approximately 69,000 tons in 1920, to 311,000 tons in 1929, or an increase of 351 per cent.

In this group New Mexico, where the control of fertilizers was authorized in 1929, has just put out a fertilizer report. In 1930 there were 30 fertilizer registrations. The law requires that reports of all fertilizer shipments into New Mexico be made to the Feed and Fertilizer Control Office within 24 hours after the shipment is made. Based on such reports, a total of 1,787 tons of fertilizer were shipped into New Mexico in 1930. Up to February 11, 1931, 16 registrations had been made for the current year. While a noticeable percentage of the tonnage was superphosphate, it is also very interesting to note that the mixed fertilizers registered for sale are all high analyses, such as the 6-10-7, 4-8-4, 4-12-4, 5-8-6, 6-12-6, 0-15-6, and 5-15-5. It is evident that New Mexico is not only increasing fertilizer usage, but is also avoiding the mistake common in a great many older fertilizer territories of going through the unprofitable very low fertilizer analysis cycle. Doubtless in the next decade a great many interesting developments will take place in fertilizer usage in this territory.

"Hope Springs Eternal..."

The American Tobacco Company's Board of Directors' answer to the depression was a vastly increased budget for advertising Lucky Strikes. Captains of industry and general managers of large financial institutions realize (and employees and workers in the ranks should realize) that it requires more energy, effort, ingenuity, and originality to run a business successfully when times are bad than when times are good. It does not require courageous leadership or marked ability to swim or float along with the current. It is when we strike the whirlpool of an economic depression that we need strong leadership of courage and vision.

The action of this board of directors was wise, and benefits from it will be twofold. First, advertising is a tremendous motive power in not only maintaining present business but in building up new business as well. Second, this greatly increased fund calls for the expenditure of millions of dollars that will be distributed among such industries as newspapers, magazines, paper manufacturers, etc., who employ vast numbers of workers who must be gainfully

employed in order to purchase their full requirement of "Luckies."

There is a great lesson to be learned by the farmer from this master-stroke of good business approved by these wise men. Spring and planting time is just around the corner, and although times are admittedly bad, and farm prices extremely low, yet the farmer must do something with his land, livestock, labor, machinery, and opportunity, and the only way out is forward. Urged on by that enterprise that has lifted American agriculture from a crude beginning to its present leadership, we are sure to see with the coming of the spring season, with its attendant sunshine and showers, a breaking away of the clouds of depression and there will emerge a new agriculture that will be far better and more self-sustaining than we have ever known.

However, we must not become disillusioned or overcome with optimism even though in the springtime "Hope springs eternal in the human breast." Rather we must keep a cool head and both feet on the ground. In such a condition we can meet our perennial problem of how best to conduct our farm in order first to make a good living and second to make as much money as possible.

What is good business in selling cigarettes is good business in farming. The American Tobacco Company directors not only spent their usual amount for advertising but greatly increased it. They have found that advertising is the best way to expand business and insure profits. In farming one of the best assurances of bigger yields of better quality is through the liberal use of carefully selected high-grade fertilizers.

The U. S. Department of Agriculture in cooperation with the various State Experiment Stations has conducted carefully planned tests that show that yields of cotton, corn, potatoes, wheat, and other crops are greatly increased by the use of fertilizers. These stations' results further point out that as yields are increased by the judicious use of fertilizers, cost per unit is correspondingly lowered. Fertilizer should not be looked upon as an expense of farming but as an investment that on the average will pay a handsome profit. A farmer cutting his fertilizer bill in the spring will ultimately cut his profits at harvest time. He should grow more cotton, corn, hay, tobacco and other feed and food crops on fewer acres. To do this he must plant only his best acres and intelligently fertilize them.

Balanced Agriculture

The better balance between production and market demand in agriculture has occurred coincidently with the more extensive use of the facts and services provided by the expanding organization of the Bureau of Agricultural Economics, says Nils A. Olsen, chief of the Bureau, in his report to Secretary Hyde of the Department of Agriculture upon the work of the bureau in the fiscal year 1929, recently made public.

A staff of more than 2,000 workers scattered throughout the United States and in several foreign countries form the largest economic fact-gathering agency in the world working for the agricultural industry of any country.

Through the use of economic information, the business of farm production and distribution is gradually being reorganized and redirected.

The bureau's Outlook reports now cover 38 of the most important crops and livestock, giving world-wide and domestic conditions of production and demand and probable trends of production and prices to aid producers in planning for profitable farming. Through extensive agencies—radio, the press, etc.—this information is being carried into every farm community in increasing degree.

Among the bureau's research projects, the mere mention of which indicated the complexity of modern commercial agriculture, are studies of types of farming, large-scale versus small scale farming, power farming, the outlook for farm commodities in the markets of the world, statistical methods of crop estimating and forecasting, cotton grade and staple estimating, cooperative marketing, direct buying, foreign competition and demand, price analysis, transportation, credit and finance, shifts in farm population, land utilization, land settlement, and land values.

"Studies of types of agriculture in specific regions and localities are being continued," Mr. Olsen says, "as well as of the broader aspects of agricultural development. Such research points the way for more efficient and profitable farming in the future. Price analysis and its application in outlook and price-situation reports is being further developed. Intensive studies regarding the most effective use of land in areas of low agricultural productivity are being made. Investigations in farm management are enabling farmers to make adjustments to the economic outlook and to low production cost.

In addition to the above, Mr. Olsen says, "Increasing attention is being given to the marketing of agricultural commodities; progress is being made in developing a crop-reporting service for foreign countries; and improved methods are being devised for estimating acreage changes, and in forecasting crop yields. Also much educational work has been done by the Bureau in reducing waste and losses in the marketing of perishable farm products."

Altogether, this report of Nils A. Olsen of the Bureau of Agricultural Economics is an illuminating discussion on how the facts and service provided by this Bureau can help the farmer.

A Cotton Utopia

In years of over-production and low prices we always have acreage reduction campaigns. Economists tell the farmers that they must keep their production in line with consumption and generally blame them for all that has happened. Are the farmers to blame? Let's consider the cotton situation, for example.

In the spring of 1930 the farmers of the South planted 46,187,000 acres of cotton and with an average abandonment of 2.1 per cent harvested 45,218,000 acres. The general feeling at this time was that business conditions would gradually grow better, but the reverse has been true. Home consumption and foreign exports of cotton have shown a steady decline ever since the 1930 cotton crop was planted.

The December 1 estimate showed that the farmers of the South had produced 14,243,000 bales of cotton, a normal crop for the last seven years. But due to small home consumption and a reduction in foreign exports, a large carry-over has been created, and an otherwise normal crop of cotton has become an exceptionally large crop because the total supply of American cotton for the time is in excess of world demand. The price has declined far below any reasonable cost of production.

The average yield of cotton per acre in 1930 was 150.8 pounds. Had the average yield been 130.6 pounds as in 1923, the total crop would have been 11,811,000 bales rather than 14,243,000 bales. On the other hand, had the yield been 182.6 pounds as in 1926 the total crop would have amounted to 16,514,000 bales. What would the price of cotton be had the latter crop been produced?

From the figures just given we see that with a crop of 45,000,000 acres of cotton, weather and insect damage can make a difference in the total yield of 5,000,000 bales, but what can we do about it? A manufacturing plant can revise its production schedule at any time, but once a crop is planted its yield lies in the lap of the gods.

We understand that in Utopia the supply of cotton and the demand for it are always equal. We will possibly have a like situation in this country, 1. When there is an accurate forecast of consumption and exports of cotton; 2. When the acreage planted to cotton and the fertilizers used are controlled; 3. When weather and insect damage are controlled; 4. When there is a complete removal of any surplus from all sources of supply.

Government and Soil Improvement

It would appear that more than usual interest on the part of Canadian Government officials is being taken in furthering the intelligent use of fertilizers. At a recent conference arranged by Professor L. C. Harlow of the Soil and Fertilizer Division of the Department of Agriculture and held in Halifax, Government officials and representatives of the colleges met representatives of fertilizer companies to cooperate in a more systematic and united plan of fertilizer usage. The problems discussed included not only the use of fertilizers but the education of fertilizer salesmen, toward the end that larger yields per acre may be produced in the cheapest possible way by adapting fertilizers to the soil and crop.

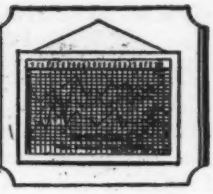
At the annual conference of the staff of the New Brunswick Department of Agriculture with officials of the Dominion Department of Agriculture at Fredericton, N. B., January 15, the pasture improvement demonstrations organized by the Provincial Department in 1930 were favorably commented upon and their continuation recommended during the following year. A possible influence of the system of pasture improvement with commercial fertilizers upon the livestock industry in the province was indicated from one of the demonstrations conducted during the past year, where 7,624 pounds of milk were taken off an acre of fertilized pasture during a period extending from May 14 to August 10.

In connection with the interest in pasture improvement it is to be noted that the Department of Agriculture in Quebec is offering a grant of $4.00 an acre to help county agents induce farmers to fertilize their pastures. Between five and fifteen farmers must be found who fertilize three to eight acres of pasture, leaving an equal area unfertilized, to get the benefit of this grant. Records will be kept of the number of grazing days, number of cows, and surplus milk produced on the fertilized area.

In Ontario the Agricultural College is cooperating with the fertilizer industry in an extensive fertilizer and soil improvement program. An article by Henry G. Bell, Associate Professor of Chemistry in Charge of Fertility Extension, of the Ontario Agricultural College, appearing in the February issue of BETTER CROPS WITH PLANT FOOD, describes some of this work.

Millions of dollars are spent in North America annually on fertilizers. If agriculture is to prosper, both the farmer and the industry must make a profit on this large investment. It is, therefore, encouraging to see the cooperation between government officials, the fertilizer industry, and the farmers in solving the intricate problems involved.

AGRICULTURAL DEVELOPMENTS



At Pendergrass School

By H. T. Maddux

Atlanta, Georgia

ON Friday night, February 13, 1931, in a heavy rain which had lasted all day, 25 farmers gathered at Pendergrass schoolhouse in Jackson county, Georgia. This was the tenth night they had met to discuss farm problems and make plans for 1931 as to crops to be grown, seed to be used, methods of cultivation, and fertilizer practices on their red and gray clay soils. On this particular night they discussed cotton.

In an effort to reduce the amount of short staple cotton and better compete with cotton farmers in the western section of the cotton belt, they selected four varieties of seed which would give them desired staple length. These varieties were: D. & P. L. 4-8, Coker's Cleveland No. 5, Piedmont Cleveland, and College No. 1.

As to methods of planting they decided upon 3½ foot rows, with 2 plants every 12 inches apart. Where only one plant per hill was used, they decided upon a spacing of 8 inches for best results.

In the face of a large world carry-over of cotton, they considered a reduction of acreage imperative. The fact that Southeastern States are unsuccessfully competing with the West in cotton production was brought out. The farmers expressed themselves as follows: "There is but one successful way to compete with the West in cotton production—by growing more cotton per acre, as facts have shown that as production per acre increases, the cost per pound to produce decreases."

As to fertilizers they decided upon 60 pounds of phosphoric acid, 56 pounds of ammonia, and 58 pounds of potash per acre for cotton on their red clay soils and the same phosphoric acid and ammonia but 68 pounds of potash for their gray soils. A portion of the ammonia and potash was to be used as a top-dresser. The plan specified 75 pounds of muriate of potash per acre in the top-dresser.

Considering the total plant food per acre this gave them the equivalent of 600 pounds of a 10-9-9½ on the red clay soils and 600 pounds of a 10-9-11 on gray soils.

Up to 1927 the farmers of this section thought that because their red and gray soils contained relatively large amounts of native potash that 3 to 4 per cent potash in the planting mixtures was sufficient. However, Jackson county fertilizer men at Braselton, Talmo, Jefferson, and Commerce recommended more potash for cotton and the farmers of this section have found that they can use at a profit three times as much potash for cotton as in the past. Some farmers also have found that extra potash pays good returns on small grains and on corn.

IOWA SEEKING SUBSTITUTE CROP FOR OATS

More Iowa farmers are considering a substitute crop for oats this year than ever before because of continued low oat prices, according to H. D. Hughes of the farm crops department at Iowa State College.

Mr. Hughes suggests four crops, barley, flax, soybeans, and winter wheat, which may be used to replace part of the oat acreage to give a larger net return. Barley is probably the best substitute on Iowa farms, he says, because it fits perfectly into the rotation, is seeded at the same time as oats, it is an excellent nurse crop for clover, and it gives about the same distribution of labor.

Experiments by the College show that barley will produce about 25 per cent more pounds of grain per acre than oats, on the average. Thirty per cent of the oat kernel is hull, while only 15 per cent of the barley kernel is hull, thus giving a net gain of about 50 per cent of actual feed from barley as compared with oats.—*Marketing Activities*, Feb. 18, 1931.

CANADIAN CO-OPS GROW IN NUMBER

Cooperative associations in Canada numbered 1,095 in 1930, with a total membership of 690,685. In 1929, there were 936 of these organizations, which reported 512,835 members. This type of organization includes the grain growers of the prairies, the largest cooperative organization in Canada, the dairy farmers, and the fruit and vegetable growers in the eastern provinces. In addition, there are some 325 cooperative distribution societies affiliated with a central cooperative union. There are also a number of consumers' cooperative societies outside the union, the majority being in the western provinces.

Sweet Potatoes

(*From page* 30)

Every plant in the one-half acre plot was set out by this 11-year-old boy. Using a trowel, it required the best part of two days before the task was completed. Of course he had some help; his sister Evelyn, aged eight, dropped the plants for him.

Most of the cultivating was handled by his father, as Byron was too small to handle the heavy cultivators. Although he was relieved of this part of the work, he did not escape putting in the time necessary to complete his own project. His father gave him a horse and a lighter cultivator and had him put in the same number of hours in the asparagus fields.

Outside of the horse cultivation, all of the hand work was performed by Byron, himself. All of the hoeing and "browsing," was done by this youthful club member, and later on he kept the field clean of weeds and grass.

At digging time, the farm crew who were harvesting his father's crop turned in and dug his plot. Byron helped to pick off the potatoes and pack them in bushel hampers. When the crop was dug and the baskets counted, Byron found that he had 123 bushels of prime potatoes and 50 bushels of seconds from his half-acre plot, all of which were marketable. On the basis of the prevailing prices, the crop from the 3,600 hills was valued at $215.70. But this was not all clear money. Byron had a labor bill to pay. His father had charged him for the fertilizer and the hampers, which totalled $60.70, leaving him a

(*Turn to page* 51)

Twenty-five Years of Service

DR. PAUL KRISCHE celebrated on March 6, 1931, the 25th anniversary of his services as Director of the Literary Bureau of the German Potash Syndicate and Editor of the illustrated agricultural bimonthly magazine "Die Ernaehrung der Pflanze" (Plant Nutrition).

DR. PAUL KRISCHE

Born in Goettingen, January 5, 1878, Paul Krische studied Natural Science at the University there. After extended foreign travel, he was assistant from 1904-1906 at the agricultural experiment station at Koeslin, and since has been librarian of the German Potash Syndicate. In addition to his contributions to German and foreign technical publications, Paul Krische has published material in the fields of chemistry, agricultural chemistry, the potash industry and soil science:

1904: How to Study Chemistry? 2nd Ed. 1919,
1905: Methods of Agricultural Chemical Research. Russ. 1911, 2nd Ed. 1928,
1906: Agricultural Chemical Control Methods,
1908: Value of Potash in Industry and Agriculture,
1910: Extracts from the Potash Year Book,
1911: Agricultural Chemistry (Teubner) 2nd Ed. 1921,
1916: Potash Fertilization,
1921: Principal Agricultural Soil Types of Germany,
1923: Potash,
1929: Soil Maps.

"Die Ernaehrung der Pflanze" is one of the broadest technical publications for agricultural chemistry and scientific soil investigation. In addition to evolving a clear, easily understandable, narrative style, especially provided with pictures and charts, on agricultural, market gardening, and forestry fertilizer experiments and plant physiological investigations, Paul Krische has fostered various special fields in this magazine. Among these are experiments on improvement of quality through fertilization, the con-

trol of plant disease and pests by fertilization, portrayal of domestic and foreign agriculture, and agricultural statistics and history. Enjoying constant entrance to the agricultural research and teaching institutions of the world, "Die Ernaehrung der Pflanze," under the 25 years of Paul Krische's editorship, has contributed materially to the advancement and spreading of new practices and research in the field of plant production, especially since the magazine receives the contributions of distinguished technical specialists of various lands.

Controlling Tobacco Wildfire

THE most important factors in the outbreak, spread, and control of wildfire disease are: 1. the weather conditions; 2. the methods of cultivation; and 3. the fertilization of the tobacco plant.

As American workers stated in 1922, there must be 4 or 5 days of stormy, rainy weather before wildfire becomes noticeable. The experiments of the author checked the conception of American workers assuming an incubation period of 5 to 8 days. Sunny, dry weather with cold nights seems to prevent the spread of the disease, while hail favors it very much.

Certain methods of cultivation spread and encouraged the disease. Early and low topping of the plant increased its susceptibility, while late and high topping produced more resistant plants. No topping prevented the appearance and spread of wildfire almost entirely. No topping of tobacco plants, however, is not to be recommended, for economical reasons, as a poor quality of leaf develops, and also as a botrytis fungus living in the petals of the tobacco flower would cause leaf rot of the tobacco leaves. The reason why early and low topping encourages the development of the fungus is to be seen in the retarded ripening of the leaves, which retain a high protein content over a longer period. The plant tries to restore the disturbed morphological and physiological equilibrium by compensation sprouts.

Fertilization influenced the disease considerably as was made clear by pot and field experiments of the author in 1928 and 1929. Plants receiving a deficiency of potash or nitrogen or no fertilizer are the most susceptible. A surplus of potash prevents outbreak and spread of the disease entirely, while a surplus of phosphoric acid is of little use. The addition of magnesium salts did not give beneficial results. The lime content and the soil reaction seemed to be minor factors with the disease. Older leaves are generally not so much affected with wildfire as younger ones, high in protein. With the addition of much nitrogenous material this is reversed. Then the older leaves retaining the protein over a longer period are the more susceptible, while the younger leaves are more or less resistant. With potash-fertilized plants, after artificial infection with wildfire, the disease was overcome without any delay in growth and with little or no loss in leaf surface; while plants receiving an excess of nitrogen could finally outgrow the disease too, but with much retardation in growth and loss of leaf surface.

The yellow flowering tobacco was resistant to infection with wildfire.

Spraying with 1-2 per cent bordeaux mixture checked the spread of wildfire, but only in the case of well-fertilized and well-treated plants. Spraying may be resorted to with younger plants, but it is not economical with older plants.—*Karl Böning, Zeitschrift für Parasitenkunde, II. Bd., Heft* 5, 1930, S. 645.

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, Crops, Crop Diseases, and Insects. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

Additional information on factors important in the production of sugar beets is presented by Dr. J. Tyson in Technical Bulletin 108 of the Michigan Agricultural Experiment Station, entitled "Influence of Soil Conditions, Fertilizer Treatments, and Light Intensity on Growth, Chemical Composition, and Enzymic Activities of Sugar Beets." It was found that the mineral content of the beets followed a definite ratio when the largest roots were produced. When this ratio was disturbed, smaller beets resulted. The order in which the nutrients were found on the leaves, from highest to lowest, was potassium, phosphorus, nitrogen, calcium, and magnesium. The same order prevailed in the roots except that calcium and magnesium were reversed. It was brought out that the life processes and chemical transformations which take place within a plant are influenced more by the ratio and concentration of all the nutrients, excluding nitrogen, than by the supply of any one nutrient. The sugar content of the beets was usually highest on the plots producing the best yields of roots. When large quantities of nitrate of soda were applied or when it was applied late, the sugar content was lowered, although the growth of the beet may be increased. However, a definite minimum quantity of nitrogen is essential for growth. On soils low in potash, the potash fertilizer increased the sugar content of the beet. On other soils it had little influence on the sugar content. The intensity of the light did not influence the sugar content, but affected the weight of the beet. Poor light thus reduces the total sugar produced. This research bulletin will be of interest to those interested in the why and wherefore of fertilization, primarily of beets, but also other crops.

Those interested in the broad question of fertilizers, their use and production in the world as a whole and by countries will find valuable information in Circular 129 of the U. S. D. A., "Survey of the Fertilizer Industry" by P. E. Howard. In addition to data by countries, the production and consumption of fertilizers in this country by States is given special attention.

The old question as to whether chemical analysis of the soil would tell what fertilizer to use, is indirectly answered again in the negative by Dr. J. A. Bizzell in Bulletin 513 of the Cornell University Agricultural Experiment Station, entitled "Chemical Composition of New York Soils." In this he reports the amounts of total nitrogen, phosphorus, sulphur, potassium, calcium, and magnesium in a large number of soils in this State. Large variations naturally were found, although relationship to several factors could be noted. The heavier soils such as clay loams and clays tended to be noticeably higher in nitrogen and potassium and to a lesser extent in magnesium, sulphur, and phosphorus. Calcium did not bear a consistent

relation to soil texture. Nitrogen and sulphur are higher in the surface soil, while potassium and magnesium and sometimes calcium are higher in the sub-soil. Phosphorus is variable. The author considers this data with respect to the potential fertility of New York soils. With a few exceptions, the soils are well supplied with total nitrogen, sulphur, magnesium, and potassium and tend to be low in phosphorus and calcium. However, many soils producing poor crops are shown by the chemical analysis to be relatively rich in total plant nutrients, and in some cases the converse is true. We thus can arrive at the conclusion that total nutrient content is not a guide to the fertilizers needed. A good example of this is potassium which was found in large quantities in some soils which responded to potash fertilization. The author concludes that it appears as if only a very small part of the soil potassium was immediately available for use by the plants.

Nitrogen and potash were found to be the most important fertilizers in the production of potatoes according to L. W. Ware in Circular 92 of the Mississippi Agricultural Experiment Station, "Fertilizer Work with Irish Potatoes." This is in the nature of a progress report, but gives interesting results and guides in the fertilization of this important crop.

"Quarterly Bulletin," State Board of Agr., Dover, Del., Vol. 20, No. 4, Dec., 1930.

"Testing Corn Stalks Chemically to Aid in Determining their Plant Food Needs," Agr. Exp. Sta., Lafayette, Ind., Bul. 298 (Rev.), Jan., 1930, G. N. Hoffer.

"Official Inspections," Agr. Exp. Sta., Orono, Me., Bul. 137, Oct., 1930, James M. Bartlett.

"Commercial Fertilizers," State Fertilizer Inspection Service, College Park, Md., Control Series, No. 138, Jan., 1931.

"Fertilizers, What They Are and How to Use Them," Agr. Exp. Sta., New Brunswick, N. J., Ext. Bul. 79, Oct., 1930, H. R. Cox.

"Lysimeter Investigations: 1. Nitrogen and Water Relations of crops in Legume and Non-Legume Rotations," Agr. Exp. Sta., Geneva, N. Y., Tech. Bul. 166, July, 1930, R. C. Collison and J. E. Mensching.

"Fertilizer Bulletin, 1929," Pennsylvania Dept. of Agr., Harrisburg, Pa., Bul. 495, Vol. 13, No. 10, Aug., 1930, James W. Kellogg.

Soils

A very interesting bulletin showing the changes in needs of soils over a number of years has been prepared by Dr. F. C. Bauer and entitled "Response of Illinois Soils to Systems of Soil Treatment" (Illinois Agricultural Experiment Station, Bulletin 362). The yields obtained on experimental fields located on a number of the most important soils of the State for a period of 15 to 25 years with various systems of management are analyzed. When this work was started the treatments in grain farming that gave the most profitable results were usually the crop residue plowed down plus lime. Later rock phosphate began to give returns and now potash is necessary on nearly all of the light colored soils and also on some of the dark colored soils. The results from rock phosphate have been variable, giving rise to a number of questions as to the relative value of this material. The author analyzes the various factors carefully and among other things concludes it is a satisfactory carrier especially when crop residues are plowed down in the rotation and the soil is not too sweet. The author finds an increasing need for potash, especially on the light colored soils, alkali soils, and peat soils. The author concludes that "potassium has a more important place in the soil treatment systems on some types of soil than was anticipated when these experiments were established." Based on this work Dr. Bauer makes recommendations for management practices on these various soils and also gives a few basic principles of sound soil management. The bulletin is a distinct contribution to our soil fertility literature.

"Soil Survey of The Buckeye-Beardsley Area, Arizona," U. S. D. A., Wash., D. C., No. 3, Series 1927, W. G. Harper and F. O. Youngs.

"Microbiological Studies of Some Typical Iowa Soil Profiles," Agr. Exp. Sta., Ames,

Iowa, Res. Bul. 132, June, 1930, P. E. Brown and T. H. Benton.

"Soil Survey of Washington County, Ohio," U. S. D. A., Wash., D. C., No. 19, Series 1926, S. W. Phillips, H. M. Smith, A. H. Paschall, Ralph Blaney, and George Drewes, Jr.

"Progress Report of the Irrigated Eighty-Acre Demonstration Farm Unit of the Harney Branch Experiment Station, 1927-1930," Agr. Exp. Sta., Corvallis, Wash., Bul. 270, Oct., 1930, Obil Shattuck and Roy E. Hutchison.

"A Chemical and Microbiological Study of Lufkin Fine Sandy Loam in Relation to Productiveness," Agr. Exp. Sta., College Station, Tex., Bul. 421, Jan., 1931, E. B. Reynolds.

"Character of the Colloidal Materials in the Profiles of Certain Major Soil Groups," U. S. D. A., Wash., D. C., Tech. Bul. 228, Jan., 1931, M. S. Anderson and Horace G. Byers.

"Variations of the Colloidal Material Extracted from the Soils of the Miami, Chester, and Cecil Series," U. S. D. A., Wash., D. C., Tech. Bul. 229, Dec., 1930, R. S. Holmes and Glen Edgington.

Crops

With considerably less fall of rain and snow this winter in many sections of the country, there is much speculation as to whether the serious drought of 1930 will carry over into this spring's growing season. Without doubt, this condition is becoming a matter of concern to some farmers planning their spring planting and fertilizing programs. An interesting discussion of the beneficial effects of fertilizers in a dry year is to be found in bulletin 470, "Forty-Ninth Annual Report 1929-1930," of the Ohio Agricultural Experiment Station, just released. Results in the fertility test at Ohio's Madison County Experiment Farm show that, while the total yield of all crops was reduced by the extreme drought of 1930, the increase of the fertilized over unfertilized plots was nearly as large as is secured as an average over a period of years.

"Kudzu in Alabama," Agr. Exp. Sta., Auburn, Ala., Cir. 57, Jan., 1931, R. Y. Bailey and E. L. Mayton.

"The Date to Plant Corn in Colorado," Agr. Exp. Sta., Ft. Collins, Colo., Bul. 369, Dec., 1930, D. W. Robertson, Alvin Kezer, and G. W. Deming.

"Oat Varieties in Colorado," Agr. Exp. Sta., Ft. Collins, Colo., Bul. 370, Dec., 1930, D. W. Robertson, Alvin Kezer, F. A. Coffman, J. F. Brandon, Dwight Koonce, and G. W. Deming.

"A Progress Report on Onion Investigations in the Arkansas Valley," Agr. Exp. Sta., Ft. Collins, Colo., Press Bul. 75, Jan., 1931, E. J. Allen.

"Dedication of Atwater Laboratory," Agr. Exp. Sta., Storrs, Conn., Bul. 168, Nov., 1930.

"Rose Growing," Agr. Ext. Ser., Gainesville, Fla., Bul. 59, Oct., 1930, W. L. Floyd and John V. Watkins.

"The Tung-Oil Tree," Agr. Exp. Sta., Gainesville, Fla., Bul. 221, Oct., 1930, Wilmon Newell, Harold Mowry, and R. M. Barnette.

"Inheritance in Lettuce," Agr. Exp. Sta., Urbana, Ill., Bul. 356, Oct., 1930, Charles E. Durst.

"Peach Pointers," Dept. of Agr. Ext., Purdue Univ., Lafayette, Ind., Ext. Bul. 171, Dec., 1930. Monroe McCown.

"Annual Report for Fiscal Year Ending June 30, 1930," Agr. Exp. Sta., Ames, Iowa, Oct., 1930.

"The Production of White Burley Tobacco," Univ. of Kentucky, Lexington, Ky., Cir. 230 (Rev.) Sept., 1930, E. J. Kinney.

"Raspberry Culture in Kentucky," Univ. of Kentucky, Lexington, Ky., Cir. 23 , July, 1930, W. W. Magill.

"Annual Report for the Year Ended December 31, 1929," Univ. of Kentucky, Lexington, Ky., Cir. 236, Jan., 1930.

"Strawberries For The Garden," Univ. of Kentucky, Lexington, Ky., Cir. 238, July, 1930, A. J. Olney.

"American Potato Journal," The Potato Association of America, East Lansing, Mich., Vol. VIII, No. 1 and 2, Jan. and Feb., 1931.

"Forty-Second Annual Report for the Fiscal Year Ending June 30, 1929," Agr. Exp. Sta., A. & M. College, Miss.

"Pasture Crops For Spring Pigs, Their Value and Use," Agr. Exp. Sta., Bozeman, Mont., Bul. 236, Dec., 1930, W. E. Joseph.

"Experiments with Alfalfa, Clover, and Timothy for Hay in New Jersey," Agr. Exp. Sta., New Brunswick, N. J., Bul. 512, Nov., 1930, H. B. Sprague, E. E. Evaul, H. W. Reuszer, and N. F. Farris.

"Forty-Ninth Annual Report for the Fiscal Year Ended June 30, 1930," Agr. Exp. Sta., Geneva, N. Y., Jan. 1931, U. P. Hedrick.

"The Effect of Spiral Ringing on Solute Translocation and the Structure of the Regenerated Tissues of the Apple," Agr. Exp. Sta., Ithaca, N. Y., Memoir 133, Oct., 1930, L. H. MacDaniels and Otis F. Curtis.

"Growing Onions on the Muck Soils of New York," Agr. Exp. Sta., Ithaca, N. Y., Bul. 510, Sept., 1930, J. E. Knott.

"Filberts," Agr. Exp. Sta., Geneva, N. Y., Bul. 588, Dec., 1930, G. L. Slate.

"Identification of Mazzard and Mahaleb Cherry Rootstocks," Agr. Exp. Sta., Geneva,

N. Y., Cir. 117, Dec., 1930, H. B. Tukey.

"The Bimonthly Bulletin," Agr. Exp. Sta., Wooster, Ohio, No. 148, Jan.-Feb., 1931.

"Methods of Ginning in Relation to the Grade and Staple of Cotton," Agr. Exp. Sta., College Station, Tex., Bul. 416, Nov., 1930, D. T. Killough and G. T. McNess.

"Varieties of Cotton for North Texas," Agr. Exp. Sta., College Station, Tex., Bul. 417, Nov., 1930, P. B. Dunkle.

"Citrus Production in the Lower Rio Grande Valley of Texas," Agr. Exp. Sta., College Station, Tex., Bul. 419, Dec., 1930, Hamilton P. Traub and W. H. Friend.

"Virginia Department of Agriculture and Immigration," Richmond, Va., Bul. 277 and 278, Jan. and Feb., 1931.

"Feeding Value of Alfalfa Hay Treated With Calcium Arsenate," Agr. Exp. Sta., Logan, Utah, Bul. 223, Dec. 1930, H. J. Frederick.

"Fortieth Annual Report for the Fiscal Year Ended June 30, 1930," Agr. Exp. Sta., Pullman, Wash., Bul. 245, Dec., 1930.

"Annual Report of the Western Washington Experiment Station For the Fiscal Year Ending March 31, 1930," Agr. Exp. Sta., Puyallup, Wash., Bul. No. 18-W (New Series), Oct., 1930.

"Cut The Cost of Feeding Cows," Agr. Exp. Sta., Madison, Wis., Bul. 417, Sept., 1930, E. B. Hart and G. C. Humphrey.

"Origin and Nature of Rogues in Canning Peas," Agr. Exp. Sta., Madison, Wis., Res. Bul. 101, Nov., 1930, E. J. Renard.

"Proximate Composition of Fresh Vegetables," U. S. D. A., Washington, D. C., Cir. 146, Jan., 1931, Charlotte Chatfield and Georgian Adams.

"Tobacco Culture," U. S. D. A., Washington, D. C., Farmers' Bul. 571, (Rev.) Nov., 1930, W. W. Garner.

"The Making and Feeding of Silage," U. S. D. A., Washington, D. C., Farmers' Bul. 578 (Rev.) Oct., 1930, T. E. Woodward, J. B. McNulty, George M. Rommel, E. W. Sheets, and F. R. Marshall.

"Watermelons," U. S. D. A., Washington, D. C., Farmers Bul. 1394, (Rev.) Oct., 1930, W. R. Beattie.

"Currants and Gooseberries, Their Culture and Relation to White-pine Blister Rust," U. S. D. A., Washington, D. C., Farmers' Bul. 1398 (Rev.) Oct., 1930, George M. Darrow and S. B. Detwiler.

"The Common Barberry and Black Stem Rust," U. S .D. A., Washington, D. C., Farmers' Bul. 1544 (Rev.) Nov., 1930, E. C. Stakman and Donald G. Fletcher.

"Sugar-Beet Culture in the Humid Area of the United States," U. S. D. A., Washington, D. C., Farmers' Bul. 1637, Nov., 1930, J. G. Lill.

"Potato Production in the Far Western States," U. S. D. A., Washington, D. C., Farmers' Bul. 1639, Nov., 1930, William Stuart.

"Asparagus Culture," U. S. D. A., Washington, D. C., Farmers' Bul. 1646, Nov., 1930, Ross C. Thompson.

Economics

With cotton prices the lowest in 15 years, the recent bulletin of the United States Department of Agriculture, entitled "The World Cotton Situation, With Outlook for 1931-32, and the Long-time Outlook for Southern Agriculture," should be of interest to those concerned with agriculture in the Southern States. Changes in supply and demand conditions, in both the United States and abroad, are analyzed in this bulletin. The material presented should be helpful in formulating a long-time program for Southern Agriculture.

"Marketing California Apples," Agr. Exp. Sta., Berkeley, Calif., Bul. 501, Nov., 1930, E. A. Stokdyk, H. E. Erdman, Charles H. West, and F. W. Allen.

"Taxation in Connecticut," Agr. Exp. Sta., Storrs, Conn., Bul. 166, Sept., 1930, M. Slade Kendrick.

"Prices of Illinois Farm Products From 1921 to 1929," Agr. Exp. Sta., Urbana, Ill., Bul. 363, Dec., 1930, L. J. Norton.

"Economic History of the Newlands Irrigation Project," Agr. Exp. Sta., Reno, Nev., Bul. 120, Oct., 1930, F. B. Headley and Cruz Venstrom.

"Newer Truck Crop Area Studies—A Preliminary Economic Report," Agr. Exp. Sta., Clemson College, S. C., Cir. 45, Jan., 1931, W. C. Jensen and C. Gunnells.

"Milling and Baking Qualities of World Wheats," U. S. D. A., Washington, D. C., Tech. Bul. 197, Oct., 1930, D. A. Coleman, Owen L. Dawson, Alfred Christie, H. B. Dixon, H. C. Fellows, J. F. Hayes, Elwood Hoffecker, J. H. Shollenberger, and W. K. Marshall.

"The Farm Real Estate Situation, 1929-30," U. S. D. A., Washington, D. C., Cir. 150, Nov., 1930, E. H. Wiecking and B. R. Stauber.

"Land Utilization and the Farm Problem," U. S. D. A., Washington, D. C., Misc. Pub. 97, Nov., 1930, L. C. Gray and O. E. Baker.

Diseases and Insects

"Diseases of Apples in Storage," U. S. D. A., Washington, D. C., Farmers' Bul. 1160 (Rev.) Oct., 1930, Charles Brooks, J. S. Cooley, and D. F. Fisher.

"Effect of Seed-Potato Treatment on Yield and Rhizoctonosis in Florida from 1924 to

1929," *Agr. Exp. Sta., Gainesville, Fla., Bul.* 220, *Sept.*, 1930, *L. O. Gratz.*

"The Control of Corn Diseases in Illinois," Agr. Exp. Sta., Urbana, Ill., Cir. 364, *Jan.*, 1931, *Benjamin Koehler and James R. Holbert.*

"Protecting South Carolina from Crop Pests and Plant Diseases," Agr. Exp. Sta., Clemson College, S. C., Cir. 43, *Oct.*, 1930, *J. A. Berly.*

"Blemishes and Discolorations of Market Onions," U. S. D. A., Washington, D. C., Cir. 135, *Nov.*, 1930, *G. B. Ramsey.*

Deficiencies of Complete Fertilizers

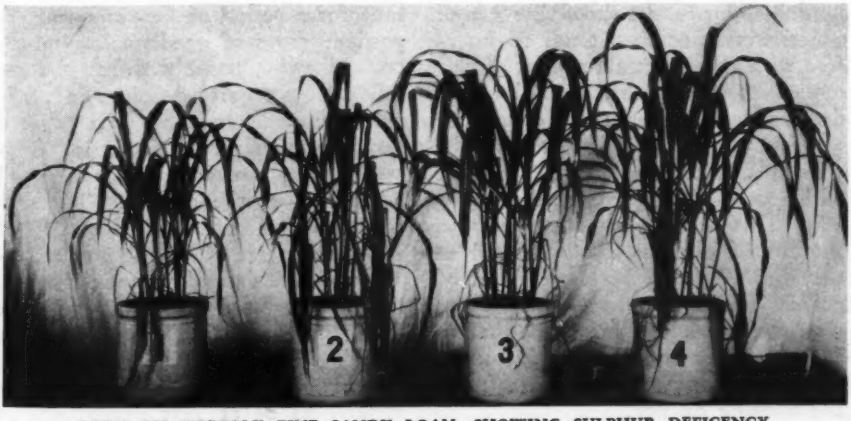
(*From page* 10)

superphosphate contributed to the result.

The insufficiency of data in this respect is obvious, but it is possible to go even deeper into the analysis of experimental results. If the calcium and sulphur contained in superphosphate augment the yield, is it not possible that after years of experimentation on the same land the phosphate content of the superphosphate would so saturate the soil with that ingredient as to make the replenishment of the moderately soluble gypsum the most important real objective of the continued use of the superphosphate? Or, conversely, if the high concentration of calcium in superphosphate is responsible for the inefficiency of that material as appears to be true in the peat soils of North Carolina, is it not possible that even greater amounts of phosphoric acid could be used to advantage if the calcium content could be reduced to the minimum requirements of the crop?

The facts are that with all our data on fertilizer experiments we do not know how many of the properties commonly attributed to phosphoric acid in fertilizers are really a response to the other components of acid phosphate. If it should happen that the answers to these questions when found indicate that the results obtained with the crude fertilizing materials are applicable to the use of new ones, then luck has served us well.

There is an acute need for a more comprehensive study of the plant-food deficiencies of soils, especially of those showing the greatest degree of depletion of the nitrogen, phosphorus, and potassium, and for recognition of the physiological and nutrient effects of the other components of ordinary and



CORN ON NORFOLK FINE SANDY LOAM, SHOWING SULPHUR DEFICENCY

1, No sulphur; 2, Calcium sulphate; 3, Sodium sulphate; 4, Potassium sulphate.

concentrated fertilizers. Until information on these points is available, the plans of fertilizer experiments must be laid in their present empirical basis.

From the standpoint of strict accuracy a complete fertilizer is one that will supply all the plant food deficiencies of normally depleted soils, and there is considerable evidence to support the belief that extensive areas now fertilized on the basis of the three component complete fertilizers really require five or six of the essential elements. Only the heterogeneous nature of the materials used in fertilizers has delayed recognition of this fact. This interpretation is not altered by the fact that many other soils do not require that such a number of elements be supplied.

It is obviously impracticable to devise experiments for the intensive study of the optimum rates of application of any but the most costly of these ingredients of fertilizers, but this should not lead to the fallacious assumptions as to the value of all of them for influencing crop growth.

Probably it will be advisable to avoid the use of the term complete fertilizer in technical terminology rather than let expediency compromise exactness.

Feed Tobacco Well

(*From page 7*)

not generally recognized by the tobacco growers.

The effect of a high concentration of lime in the soil is to render soil potash and potash applied in fertilizers more insoluble. Care should be taken, therefore, to avoid using lime where it is not necessary; and to avoid, as far as possible, those treatments, such as applying excess quantities of nitrogen-containing materials, which increase the availability of the lime in the soil.

In addition to rendering soil potash insoluble, our results show that a high concentration of lime tends to interfere with the direct absorption of this material by the plant, especially in a dry season. Under these conditions we find that the dry matter of the cured plants contains about 8 per cent of lime and about 2 per cent of potash. This is not desirable; the large amount of calcium is not helpful to the "burn," while the low content of potash is even more undesirable from the standpoint of burning quality. The plants also contain excessive quantities of nitrogen, which is harmful to the burning quality.

Rain appears to remove some of the excess calcium and nitrogen from the soil without necessarily affecting the potash content. At the same time, there is a response in root development which aids in the increased absorption of potash. Our results show that under conditions of optimum rainfall, the plant contains less nitrogen and calcium, and more potash.

There is no doubt that some of the soils in Lancaster county need lime. On the other hand, we know of good tobacco soils that have received no lime for a period of 50 years and yet produce crops of good quality tobacco. Likewise, possibly there are some soils that are quite deficient in available nitrogen. In choosing a tobacco fertilizer formula, therefore, it is necessary to approximate the average soil conditions of the county. The recommendation of 1,000 to 1,200 pounds per acre of a 3-5-12 or a 5-5-12 fertilizer, depending upon the preceding crop and whether manure is used, is, we believe, fundamentally sound. This will increase the potash content of the tobacco, lack of which appears to be of first importance at this time.

Sweet Potatoes

(*From page* 42)

net profit of $155 for the half acre—a rate of $310 per acre.

The Swedesboro System

No story of the success of this 4-H boy is complete without a description of the system for the production of sweet potatoes that is followed in the Swedesboro area.

It is the practice on the Shaw farm to apply about 500 pounds of muriate of potash to the acre every time the crop rotation comes around to sweet potatoes. The potash is usually applied in the fall and left on the ground to be washed into the soil by the winter rains, although some growers prefer to apply the potash in the spring after the ground has been plowed.

In the spring of 1930, Mr. Shaw applied 500 pounds of muriate of potash to the soil after the ground had been plowed. This was disced into the soil about the first of April. Two weeks later, 500 pounds of a 2-8-10 fertilizer was broadcast and disced into the ground. The usual practice on the Shaw farm is to apply about 1,000 pounds of the 2-8-10 mixture, but due to a previous treatment on this particular field the amount of the complete fertilizer was cut in half.

Early in May, the ridges were made up, and the plants were set out as soon as the weather became favorable. Cultivation started immediately and was continued until the vines covered the ground. During the latter part of the season, the weeds were removed by hand. Digging in the Swedesboro section starts early in September and is usually completed by the middle of October.

Extra Potash Pays

Mr. Shaw, like most growers in Gloucester county, places much faith in this extra application of potash. He says it has become the accepted practice on about 80 per cent of the farms in the Swedesboro area and about 5,000 acres were so treated in the fall of 1930 for the coming season's sweet potato crop.

Sweet potatoes treated with the extra application of potash grow better and develop a potato that is short and chunky. Dealers will pay a premium for the potatoes from fields which have been so treated as they know that the potatoes are marketable and worth more money.

Years of Good Pasture

(*From page* 29)

his methods. He went to see the wonderful grass lands that Mr. Clark was fertilizing with nitrate of soda, bone, and potash, and was truly impressed with the tremendous yields of five and six tons of hay per acre that Mr. Clark was securing.

"Why," reasoned Mr. Phelps, "if Mr. Clark can get these results on hay, can't I do it on the pasture lands of the old home farm? The pasture is the weakest link in the farming scheme, necessitating high costs for feeding in summer. If I can build up the old pasture at small cost, it will mean more profits for me in dairying."

Even before Mr. Phelps resigned his

position to come back to the farm, he bought one bag of this wonderful fertilizer with which Mr. Clark had been so successful, sent it to Jaffrey, and had part of it spread on the pasture and the remainder about the fruit trees on the place.

"Even in that year, which was 1910," stated Mr. Phelps, "I noticed that the cows grazed off more closely the spots where fertilizer had been spread. The next year I used four bags of fertilizer in the pasture and have gradually increased the amount until for the last six years I have used 200 pounds of fertilizer per acre each season."

With the exception of one year during the war, when potash was scarce and expensive, Mr. Phelps has always used the same bone base fertilizer, analyzing 10-3-8 available and 10-8-8 total plant food.

No lime has been applied to the pasture areas during this period. A few wood ashes have been applied on some of the weak spots. Gray birch was cut at the outset on sections of the pasture, and any grass that appeared afterward would be "coaxed," as Mr. Phelps puts it, with a little fertilizer each spring until the sod was well established. No portion of the area has ever been seeded.

A Cow Per Acre

For many years Mr. Phelps has been carrying a cow for each acre of grass land. Little or no supplementary forage is given the cows except occasionally during the hot dry weather in August. The pasture season for Mr. Phelps means from May first to October first, which is several weeks or even months longer than most New England farmers feed their pastures.

These were the things we learned from Mr. Phelps at our first visit. With his permission, we decided to erect cages in his pasture to check up on his yield and study the vegetation he is producing.

Late in April we erected three square-yard cages in which to conduct our study. These cages were harvested June 5, July 12, and September 10; the material was taken to the Experiment Station at Durham, dried out, and analyzed for protein.

In the following table is presented the total yields per acre, with the protein per acre, based on the results of the harvest from the cages.

	Dry matter per acre	*Protein per acre*
Cage 1	4,815 lbs.	856 lbs.
Cage 2	2,851 "	447 "
Cage 3	4,194 "	827 "
Average ..	3,953 "	710 "

Proteins on these samples varied from 14.45 per cent to 28.76 per cent and averaged 18 per cent for all cuttings. Surely this has been a good way for Mr. Phelps to produce his protein in the summer!

During the fall of 1930, R. F. Copple, assigned to pasture investigation work in New England by the Bureau of Plant Industry analyzed the vegetation in the Phelps pasture. White Dutch clover, bent grasses, and Kentucky blue grass he found to compose practically all of the stand. Contrast with this certain untreated pastures in New Hampshire where Mr. Copple found poverty grass as the major vegetation component, and we begin to realize why yields in Mr. Phelps pasture are high and why the cows find almost their entire sustenance from the pasture.

We found in our yield study that the September harvest was in every case the heaviest of all. Although more time elapsed between the last two harvests it is indicative that the yield from these areas is high all through the season. In pastures where White Dutch clover abounds, this may be expected.

In contrast to this study which was conducted on the Phelps' farm, we have been working in 14 other pastures in southern New Hampshire. None of these pastures had been treat-

ed prior to 1929, and some of them were not topdressed until 1930. Although some of these pastures were excellent, while some of them were only fair, none of them yielded as well as the areas on the Phelps' farm, in spite of the fact that we used an initial application of 1,000 pounds of a 5-10-10 fertilizer on the complete fertilizer plots, following this in 1930 with 330 pounds of nitrate of soda on those plots that had a complete fertilizer in 1929.

Fertilizers Pay

This does not mean that our treatments have not been profitable, for they have resulted in growing protein in the pasture for a little less than half its cost in a 16 per cent dairy ration. What it does mean is that we cannot expect the highest returns from fertilizer until the type of vegetation in many of our pastures has been changed to include more of those species that make better use of fertilizer and that have a higher yield.

Even after but two years of work in these 14 pastures, we note an increase in Kentucky blue grass, bent grasses, and White Dutch Clover with a correspondingly lesser amount of poverty grass. As this change progresses, we can expect even greater response from fertilizers and a much cheaper cost of protein produced by this method.

Note in this table the response from three pastures harvested in 1929 and again in 1930.

DRY MATTER PER ACRE
AVERAGE OF THREE PASTURES

	Yield-Untreated Plots	Yield from Complete Fertilizer and lime Plots
1930	583 lbs.	2,343 lbs.
1929	550 lbs.	1,404 lbs.
Gain in 1930	33 lbs.	939 lbs.

There could not have been much difference in the season else the untreated plots would have shown a wider variation than 33 pounds of dry matter per acre. Yet the completely fertilized plots yielded on an average almost half a ton of dry matter more in 1930 than they did in 1929. This is due no doubt to the cumulative effect of the fertlizers applied, indicating that pasture fertilization, if continued, will become more profitable as time goes on.

Mr. Phelps is, of course, cashing in on past applications of fertilizer from this point of view. And this, no doubt, is what leads him to say, "I consider top-dressing my pasture the most important and paying enterprise on my farm."

A County Rebuilt

(*From page* 24)

habit of growth causes it to yield from one to four tons of hay an acre. Four to twelve bushels of seed an acre are harvested by those who gather these in the seedpan.

But it is not with lespedeza primarily that Stanly farmers are interested. It is the results following lespedeza. Man after man will say that it is the best crop he has ever grown. He will show his barn filled with hay from the crop itself; then, he will exhibit his crib filled with corn grown on lespedeza sod, or he will point out a pasture on which browse fat dairy cattle, hogs, or work stock. If time permits he will tell a story about how poor his land was before he started to grow the crop and what a transformation it has caused. Nor will it be an exaggeration.

Numerous are the old, gullied, washed, and sterile red fields made fertile again by one good crop of lespedeza turned under. As the land has improved in fertility, it is possible to use fertilizers more intelligently and profitably. Along with the fertile soils has come a paying dairy and poultry industry. Milk though cheap in price now is being made to pay a profit because of the good pastures. Stanly county wheat weighs heavy because it is produced on a strong soil. The acreage to sweet clover and alfalfa is increasing and Stanly county has rebuilt an old ramshackle, improvident sort of agriculture into one of the most alert and progressive to be found in North Carolina.

The county is not yet the leading agricultural county, because it had a long way to come. However, it has made the most substantial agricultural progress of any county in North Carolina in the 10-year period between 1920 and 1930. This cannot be successfully refuted by the most rabid and partisan Kiwanian of other counties. And better than all else, the will to win has been imparted to its inhabitants.

Club members from Stanly county take prizes; homes are being improved with lawns, lights, and flowers; communities are interested in their public welfare; and there is the glorious feeling of accomplishment pervading the county. Despite the present depression, Stanly farmers have well-filled pantries, smoke-houses, cribs, and haylofts. They may not have much cash, because no one else has; but, some of them are still making money.

Feeling of Prosperity

Here is what R. A. Lipe, president of the Stanly County Board of Agriculture, says in a letter received as this article was being prepared: "While our farmers are short in money, they are fortunate in having an abundance of things to eat and feed. I believe that Stanly county farmers as a whole are in a better position to live at home and live good at home, than they have ever been. I know my soil is more fertile now, and this is true on practically every farm in the county, and it is much easier for us to live at home when we have fertile soils. I was asked a few days ago, what was re-

A group of Stanly county farmers inspected, cut, and weighed square-rod plots of lespedeza. This particular cutting is Korean. The average height was 14 inches, and the green weight was 9,280 pounds per acre. The total dry weight after being cured for three weeks was 4,480 pounds.

sponsible for these changes, and I remarked that it was through our soil improvement and balanced farm program."

A lespedeza and orchard grass pasture actually saved one farmer financially this summer.

Ten years ago when Oscar H. Phillips began his county agent work, he laid down this principle, "Soil study and management is unquestionably the most important problem facing Stanly county farmers. The soil is the bank account of the county and unless this bank account is kept growing, agricultural disaster or agricultural bankruptcy is certain to follow." Through the years, he has followed this principle and as a result the fertility of the farms and contentment of the farmers have been rebuilt.

Minnesota Peats

(*From page* 18)

timothy hay, reed canary grass, flax, barley, oats, and 10 to 12 garden crops. A variety of fertilizers, used in different proportions and rates, were applied in strips the long way of the land, and the various crops ran across the different applications.

Six plots were treated, and a seventh, left without fertilization, was used for purposes of comparison. The results apparently indicated that the most dependable crop for the peat of that locality is clover-timothy hay. The average yield of this hay on the fertilized plots was 2.09 tons to the acre, harvested the same season as seeded. The crop on the check or unfertilized plot was scanty and light, and the yield was at the rate of less than a ton of hay to the acre.

One clover-timothy combination plot fertilized with potash at the rate of 100 pounds to the acre and phosphate at the rate of 50 pounds to the acre, the whole at a cost of $3.94, yielded at the rate of 2.12 tons to the acre, or a crop worth $24 an acre when it was cut early in September.

One plot, receiving 125 pounds of phosphate only, returned a hay yield of about three-quarters of a ton to the acre as compared with 2.10 tons of hay to the acre taken from a plot that had been given potash only at the rate of 250 pounds to the acre. This big difference indicated that on this particular piece of peat potash was most needed. This is not the case with all peats, as most of them are also deficient in phosphate.

Further trials are planned in the full expectation that the peat lands of the county can with proper treatment be made fruitful, an asset to owners rather than a liability. Goodly increases in the acreages of alfalfa and sweet clover are forecast by the county agent, who says that sweet clover pastures were the only ones to produce any amount of feed during the dry season.

The Inquiring Mind

(*From page* 16)

not gained much experience in many phases of orcharding. It is said that the U. S. Department of Agriculture often appealed to Mr. Hale to help settle difficult questions, and he always proved a wise counsellor. On one occasion he sprayed too heavily with Bordeaux mixture to control brown rot, and the trees promptly shed their leaves. What to do was the question. A new crop of leaves must be coaxed out, or there would be no fruit. The Government experts could not offer a remedy, so the New England genius devised a unique and practical cure of his own. He bought a boatload of muriate of potash and nitrate of soda in New York and applied these fertilizers lavishly in the orchard; then a warm rain fell, and presto—the trees put on a fresh garb of green and eventually produced a bumper crop of peaches.

Further to insure fertility in the great Georgia orchards, cowpeas were sown annually in the rows between the trees on 1,500 acres. Some of the forage was made into hay for the mules of the plantation, and in late summer, all of the sod was plowed under to furnish green manure.

Dynamiting was done with wonderful success in preparing new land for planting. Spraying prevented serious losses from insect pests and diseases, two tons or more of insecticides being used yearly.

About 500 white and colored laborers were employed on the plantation. Fruit grading and packing work was done by skilled white labor. The workers were housed and fed in a hotel on the premises.

The peach crop was marketed through the Georgia Fruit Exchange, city commission men who were members of the Exchange market. The cars were re-iced three times between Fort Valley and New York. Everything possible was done to insure quick delivery and to preserve the quality of fruit. Efforts in these directions have been eminently successful.

It was a specially improvised plan of combating the curculio pest that caused the neighbors to say, "The thing can't be did." But Mr. Hale successfully put into effect his scheme of jarring the trees, catching the insects on frames covered with cotton sheeting, and then dumping them into kerosene. No one else fought the "critter" and no one else in all that region had a quarter of a crop of sound fruit. That season Mr. Hale marketed one-fifth of the entire peach output of the State of Georgia, and for every dollar invested in the fight against the curculio the markets returned him $8.00.

Sought No Honor

Mr. Hale was too busy most of his life to seek public office. He did not court recognition for his notable achievements. But honors came to him nevertheless, for during the last six years of his life he was a useful member of the Public Utilities Commission of Connecticut, and in 1914 the University of Wisconsin conferred upon him its certificate for distinguished service in agriculture. At the presentation Dean H. L. Russell of the College of Agriculture, said:

"John Howard Hale is one of the foremost orchardists of America. He has reached this position of prominence through sheer ability. Denied the benefits of even a high school education, he secured his training in the school of practical experience, and with no start in life except his native ability, he has won distinction not only by the magnitude of his operations, but by the introduction of

business methods in the marketing of his product. The University of Wisconsin recognizes in him an example of what American Agriculture can produce, and I take pleasure in presenting him as one to receive the testimonial accorded those on whom this honor is conferred."

That honor, bestowed just three years before his demise, October 12, 1917, surely was richly deserved and proved that what J. H. Hale had undertaken to do, he had done with all his might. This record of his achievements should be an inspiration to every struggling worker who is endowed with a clear vision and a high purpose in life.

Proving an Idea

(*From page* 17)

fertilizing, my corn averaged 35 bushels per acre. The effect of the fertilizers on the quality of the corn was as marked as the improvement in yield.

Last year I ran out of the 0-16-6 fertilizer I was using on one of my poorest fields, when it was three-fourths planted. The unfertilized corn went down badly. A check of the yields here showed a 40 per cent increase in yield from the 0-16-6 fertilizer, the fertilized part of the field yielding 45 bushels per acre of good quality corn.

Some fertilizer plots on limed land in 1930 gave yields as follows, based on corn containing 15.5 per cent moisture.

Fertilizer	Method of Application	Yield Per Acre Bu.
0-0-0		61.7
122 lbs. 0-20-20	Hill-dropped	66.5
122 lbs. 0-20-10	Hill-dropped	68.3
202 lbs. 0-0-50 & 239 lbs. 0-20-0	Broadcast	69.0
0-0-0		60.1
239 lbs. 0-20-0	Broadcast	60.4
122 lbs. 0-20-0	Hill-dropped	64.2

The corn went down badly on the straight phosphate and on the check

This photograph was taken July 9, 1930. Left, Luther Fuller, General Agricultural Agent, C. and E. I. Railway, standing on the 0-20-20 plot. Right, L. C. Brown, standing on the check plot.

plots, indicating a need for potash. Since I use a mechanical corn picker it means quite a saving of corn to have erect stalks at harvest time.

This year I expect to plant and fertilize 700 acres of corn. I shall use two four-row planters and two four-row cultivator outfits. I intend to use a 2-16-8 or 2-12-6 fertilizer on corn.

I will have 200 acres of barley, 125 of spring wheat, 100 of oats, and 50 acres of alfalfa. I intend to apply fertilizers to these crops by means of a fertilizer grain drill, using an 0-16-6 fertilizer on the small grain and an 0-12-12 or 0-14-14 fertilizer on the alfalfa. The alfalfa will be seeded on limed land.

Complete Fertilizers for Apple Trees

(*From page 26*)

typical of much of the orchard soil in Quebec, having been formed from the breaking-down of syenitic rock. An analysis made by Dr. R. McKibben of MacDonald College, Quebec, showed that it contained 0.32 per cent phosphoric acid, 1.98 per cent potash, and 0.77 per cent total nitrogen. It was, therefore, relatively high in the essential minerals.

The trees of each variety at the beginning of the experiment in 1925 were believed to be 25 years old, and were quite uniform in size and shape. The orchard had been in sod for a number of years, and the fertility maintained by occasional applications of barnyard manure. The fertilizers were applied each spring at the time the leaf buds were bursting, being spread over the ground, under the trees, from about two feet from the trunk to a similar distance beyond the spread of the branches. Throughout the experiment, the entire orchard was kept in sod, the grass being cut once or twice a year, as necessary, and allowed to remain where cut.

The plots of Wealthy were composed of nine trees each, and those of Fameuse, twelve. In the following statements the fertilizer applications and yields of fruit are shown:—

COMPLETE FERTILIZERS INCREASED THE YIELD OF WEALTHY APPLES

Fertilizer Applications per tree	Yield per tree					
	1926 bush.	1927 bush.	1928 bush.	1929 bush.	1930 bush.	Average bush.
Nitrate of soda, 6 lbs.	8.60	1.54	6.61	4.55	5.75	5.41
Nitrate of soda, 6 lbs. Superphosphate, 5 lbs.	6.23	4.51	6.83	8.28	3.50	5.87
Nitrate of soda, 6 lbs. Superphosphate, 5 lbs. Muriate of potash, 1 lb.	9.67	2.71	10.28	9.28	6.17	7.62

COMPLETE FERTILIZERS INCREASED THE YIELD OF FAMEUSE APPLES

Fertilizer Applications per tree	Yield per tree						
	1925 bush.	1926 bush.	1927 bush.	1928 bush.	1929 bush.	1930 bush.	Average bush.
Nitrate of soda, 6 lbs.	1.12	13.97	.04	12.04	.37	13.62	6.86
Nitrate of soda, 6 lbs. Superphosphate, 5 lbs.	2.45	12.41	2.10	13.75	3.50	12.50	7.78
Nitrate of soda, 6 lbs. Superphosphate, 5 lbs. Muriate of potash, 1 lb.	.87	16.02	.21	16.46	1.08	16.90	8.59

From the foregoing statements, it may be noted that even on soil relatively high in minerals a favorable response was obtained from the use of phosphoric acid in addition to nitrogen; also that still higher yields followed the use of a fertilizer containing nitrogen, phosphoric acid, and potash.

From these results we may assume that in this soil, high in minerals and organic matter, phosphoric acid and potash are not being rendered available in sufficient quantities to meet apple tree requirements. From the experience of individual growers, it would seem that such is the case in other districts, and that better results would follow the use of a properly balanced fertilizer. From the results of work with apple trees, grown in sand cultures by M. B. Davis at the Central Experimental Farm, Ottawa, Ontario, an apple tree requires nitrogen, phosphoric acid, and potash in the proportion of 9, 5, and 7%.*

* Report of the Dominion Horticulturist, 1928.

Based on these findings, and bearing in mind that some nitrogen may be lost by leaching or denitrification, a good rule to follow would be as follows: apply sufficient nitrogen to promote satisfactory wood growth. To this add one-half as much phosphoric acid as nitrogen and two-thirds as much potash. For a 20-year-old-apple tree, growing in average soil, with an 8-inch trunk and a spread of 20 feet, the usual quantity to apply would be: 8 pounds of nitrate of soda, 4 pounds of superphosphate, and 2 pounds of muriate of potash. Other fertilizers will, of course, prove satisfactory, providing the proper balance of nutrients is maintained.

During the life of the present generation, the program of orchard fertilization has swung from one extreme to the other. It is obvious that a rational middle course of using complete fertilizers would more surely supply apple tree requirements and prove productive of better results.

Intelligence and Potatoes

(*From page* 13)

Mr. Prescott feels that his type was never so good. The extra potash rounded out the tips. Out of 23,001 bushels put in storage as they came out of the field in early October, he sold as certified seed 16,985 bushels or 80 per cent of the total yield when graded and shipped in December. This indicates excellent graded stock.

Ten dustings at the rate of 30 pounds per acre are applied 10 times during the growing season. This liberal application protects the plants from insects and blight.

Much care is exercised in harvesting. The digger is run very slowly and deeply so as to bring up a lot of soil on the bed of the digger, which reduces the distance that the tubers have to fall, minimizing bruising.

In addition to farming, Mr. Prescott finds time for community and county activities. He has served on the County Farm Bureau Executive Committee and is crops project leader of his home town Farm Bureau.

His brother John is also an active worker for the betterment of his community and county. He is serving on the Executive Committee of the County Farm Bureau and is chairman of the local Farm Bureau. He has been Town Treasurer for six years. He has a son in college, and the money to send him there came from potatoes.

Both men have always farmed for a living, and by adopting approved farm practices and through hard work, good management, and honest dealings, have placed themselves among the foremost potato producers in this country.

A. E. and U. S.

(*From page* 4)

both; and probably a new alliance between the doer and the dreamer if we are to get beyond this stone wall on which our vine of destiny is pushing upward for light and air. America cannot well surrender its pushing and daring attributes of national character, which are left over from the times described by A. L. Burt of the University of Minnesota. He testifies to the fact that America has built its national edifice but that the task of designing the dome remains as a challenge to us all. Let's take his statement here:

"This continuous rebirth of society in the west was in origin a revolt against the conservative tendency in the east, a revolt that found ample scope in the open spaces of the west. There they confirmed the impulse that had carried them forth.

"Socially in the west the individual has stood erect on his own feet instead of crouching in the nook of society where he was born—a cramping attitude—or hanging on to the family tree—a monkey attitude—and this has been forever injecting a dynamic force into the life of this continent. The restless energy, the driving power, the buoyancy and exuberance of the westerner have infected the whole. Thus we have had in America a life with little leisure and so-called culture, a life that was intensely practical and concerned with material things, a life in which emphasis was laid on growth and quantity rather than on stability and quality, and on the future instead of the past.

"We are coming to the end of the road. The last frontier in North America is closing with the disappearance of free land up north, with the dying of the pioneer urge in our society, and with our decision to bar the door against peasants from central and southeastern Europe. We may avoid waste by rationalizing the settlement of the relatively limited areas that may still be opened to agriculture, but we cannot escape the fact that we are coming to the end of the road along which our society has travelled for two centuries. What will happen when we reach the end? It would appear that North America in character is ceasing to *grow away* from Europe and is turning back to meet an *Americanized* Europe."

THIS theme of the exhausted frontier has also been taken up by one of the governors of a western State in his message, and he used it to stress the vital need for adjustment of social problems with economic forces. It is not a new idea, for Professor Frederick Jackson Turner advanced it long ago. The world is growing smaller while our problems loom larger. Ireland is not the only land in need of constructive, trained imagination.

A. E. cries for more devoted aid from the thinkers, the scholars, the teachers, and the writers, as well as the scientists. In America we seldom give them the chance to perform such services. They seldom partake in the welter of political campaigns and therefore do not stand in line for the post-election harvest. Furthermore, they tell me on every side that our educational goals are dim and their aims are not definite. They repeat frequently that science labors for materialism rather than for human welfare —for the dollar rather than the heart's desire. We hear that literature has traded its birthright for flashy and fleshy appeals and that good, old, winged Pegasus has died of the glanders.

We set the public service stage of action to cater to mass desires and whims. Perhaps the decision of the

masses is a safe and certain guide, as some insist; and perhaps the dominance of a so-called "aristocracy of culture" would be as bad for us as the rule of the bread-and-butter barons or the adroit politicians. Whoever leads must face the threat of opposition, so I fear that the plan A. E. suggests for the rebirth of an ideal Ireland, if transplanted to America, would require dual control by those who read Shakespeare and those who prefer Will Rogers. Who is there bright enough to invent a harness hitch that will get such a team pulling evenly in the traces of a national movement?

IN my State we have laid down the law that government must be supported largely on the ability to pay, and this tent is favored far and wide. Yet by way of contrast, we have seldom advanced the twin idea that government ought to be furthered and fostered by the ability to *think*. Thus have we discounted mind and leaned heavily upon money. As somebody has to find that money with which to pay, we get all tangled up in our efforts to distribute benefits equally.

When I read the following excerpt from A. E.'s booklet to my friends, the minister and the law student, I got quite contrary and equally vehement opinions. I leave it to you to determine which were yea and nay. On page 8 he says:

"A nation is but a host of men united by some God-begotten mood, some hope of liberty or dream of power or beauty or justice or brotherhood, and until that master idea is manifested to us there is no shining star to guide the ship of our destinies."

We must not be too hard on A. E. nor too skeptical about reaching this ideal, if we have not already done so to some extent. I fully believe that a nation may be much the same as the better typical Americans or the men of any race. That is, within their bodies and souls they may combine all the traits and virtues which he has set down for the make-up of a state. They may have liberty and power, beauty of person, and a sense of justice and comradeship. But along with it, being human, they possess the less desirable traits and tendencies. I do not believe this generation can make the world over anew, but as we become boxed up in tighter environments with the world neighbors at our elbows, we must practice self-control more than we have been accustomed to.

Liberty can become license, power can be arbitrary, beauty can be artificial, and even brotherhood can be drawn out much too fine at times. And sometimes leaders in such positions of control may fancy again, as they have before, that their moods are divine inspiration when they are quite the reverse. A. E. has picked a live coal from the embers in his definition of a nation's principles, but until it cools off I am afraid to touch it again. It seems sure for one thing that we must have fine *followship* as well as leadership to make an ideal state.

And using another old maxim in this connection, it is well to recall that some men live to eat while others eat to live—but in any event, they must all *eat*.

I AM not going into the details of the Irish policy that A. E. develops, bringing the lusterless folks of his land into a fullness of life that they never had before. This is all very ennobling and probably highly successful. It is being applied to the old world type of emerging democracy, born of the industrial revolution. Here in America we face a problem vexing the man owning property and whose fathers before him owned property, men who *believed* they were free at least and who have had the franchise to spend as the mood of the moment struck them.

Ours is a problem of self-control and mutual adjustment, guided no

doubt by as many frescoed ideals as the campaigners can think of. Our western advance and limitless scope, our power and activity have combined in past years to assimulate the immigrant and is almost Americanizing Europe, as Burt says. Regarded in this way, the problem which is put up to us for ultimate solution sounds as important as a decision in a court of last resort. Very likely we should begin to consider something more serious than football stadiums or beauty contests.

WE must share the ideals which A. E. Holds up for a cleaner, brighter, and finer rural environment; for a state dominated by real instincts of service to all. Listen while I give two quotations, one from A. E. and the other from the National Industrial Conference Board in its famous report on agriculture—read by a few and forgotten by many.

Says A. E. in his message: "We have to create national ideals which will dominate the policy of statesmen, the actions of citizens, the universities, the social organizations, the administration of state departments, and unite urban and rural in one spirit."

Respecting that elusive national ideal again, no less a doughty group of American savants than the National Industrial Conference Board said in its bulky report of 1927:

"Finally, it must be recognized that the current problems arising in connection with agriculture are really reflections of the changing position and relationship of agriculture in our national economic development. All these problems converge ultimately toward the question of developing a national economic policy which shall embrace all aspects of our economic life in a unified whole and allot to each its place, in the light of long-time consideration of national security, social unity, and economic justice. Casual adjustment and drifting in matters of such significance lead inevitably to more and more serious difficulty. The choice of this policy, in so far as it can be made deliberately and consciously, is a momentous thing for our future prosperity and growth."

If poor old Ireland is groping for a national policy, led by such men as Plunkett and the Poet, then how about America? How far have we advanced with our agrarian blocs toward getting legislation or social adjustments which fit somewhat into the design drafted so nobly by the National Industrial Board? How have we succeeded in getting this unified policy mapped out and adopted by the universities, the statesmen, and the organizations, desired so much by A. E.? Are we "casually drifting with adjustments" piecemeal in farm boards and marketing agencies, loan funds and pools, or are we really getting hold of an ideal that requires some time for shaping? Have we infected the rank and file of workers and farmers with the zest for a unified national policy, or are we working lopsided from the top down to jam a crown on somebody's head before he is able to wear it?

How far have we gone in getting that cooperation so earnestly requested by the board between industry, commerce, and agriculture? Are we working on platforms or platitudes?

A. E. in another place opens the thought that perhaps the world has lost its heroes and hero-worship, and that singers and poets have quit lauding the leaders and ceased to set up civic shrines. He wonders if perchance that may be the reason for our indifference and contempt, our lassitude and skepticism.

Maybe he forgets that the greatest heroes are deceased. If Lincoln had lived through the reconstruction turmoil, maybe he would have fared about like Wilson at the peace conference and afterward. If Washington advanced the "self sufficing" and "aloof from European entanglement" theory

in these days he might not be so nobly regarded either. Poets and legend writers can do a lot for ordinary folks a generation or two after they are gone. Time mellows all things and reduces some of our worst worries to a joke, while it elevates some of our best leaders to Olympus.

A. E. is trying to reach a state of society wherein people will not forever be in conflict with each other over crumbs of sustenance or a share of luxury, and where their respective efforts will not nullify each other. It is indeed a worthy road to travel in mental leadership, but a tough and devious route for the everyday man.

Some of us may have read and disagreed here and there with the imperfect philosophy of some thinker like A. E. Yet it all serves its purpose, and that is to stimulate us to give heed to some of the things taken for granted or accepted as necessary.

If it were not for just such thinkers and resolvers who pondered and finally led mankind in and out of the mazes of time, we might still be groveling in the morass of such conditions as obtained in the Middle Ages.

Many of the theories of yesterday are the laws and the prophets of today. That is why the world is getting better with each century. And even as each period has its own peculiar and difficult problems to unravel, so it usually produces men and women who finally take us by the hands and lead us slowly forth into a higher level of reason and a nobler conception of life.

So if I have been a little serious in this series for March, I humbly crave your indulgence. I have just paid my taxes and wished to take a little inventory of what the national policy would be in spending it.

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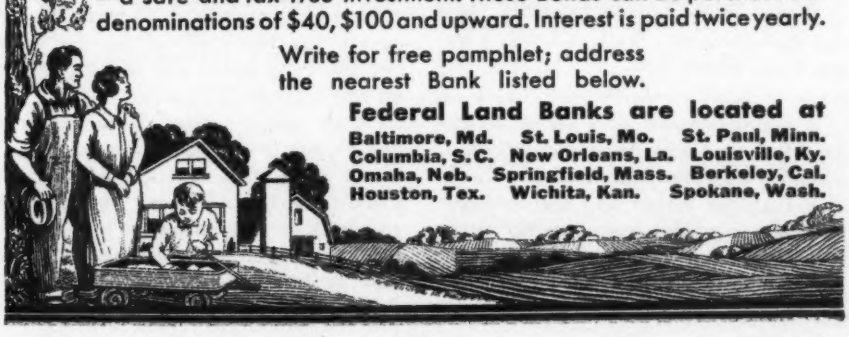

NO CHOICE

Kelly and Cohen were having dinner together. Cohen helped himself to the larger fish and Kelly said:

"Fine manners you have, Cohen. If I had reached out first I'd have taken the smaller fish."

"Vell," Cohen replied, "you got it, didn't you?"

A gushing hostess at an evening party rushed up to George Bernard Shaw and asked him what he thought of a new violinist she had discovered and who had played that evening.

"He reminds me of Paderewski," commented G. B. S.

"But Paderewski is not a violinist."

"Just so, just so," came Shaw's reply.

FED UP

Weary Willie, who was out of a job, as usual, rapped timidly at Mrs. Murphy's kitchen door. The lady, angry at being interrupted at her washing, flung open the door, and glowered at him. "Did you wish to see me?" she bellowed.

Weary Willie backed down the steps and said meekly, "Well, if I did, I got my wish, thank you."

A young woman who wished to engage Calvin Coolidge in conversation, when he was President, told Mr. Coolidge that her father had laid a wager that she couldn't get him to utter three words. She expected that this would start him talking. But he said quietly: "Dad wins!"

THE TALE BEARER

He had been to a stag dinner, and his wife wanted to hear all about it when he got home.

"Well," he said, "one rather odd thing occurred. Jim Blankton got up and left the table because some fellow told a story he didn't approve of."

"How noble of Mr. Blankton," exclaimed his wife, "and—what was the story, John?"

"Which would you rather be in, John, an explosion or a collision?"

"A collision."

"But why?"

"Because, in a collision, there ye are—but in an explosion, where are ye?"

"And, there, son, you have the story of your dad and the Great War."

"Yes, Dad, but why did they need all the other soldiers?"

SHE KNEW

The old lady was very ill. She sent for her niece and said: "Sarah, I am going to die, and I don't want anyone to be fooling about it. When you come to lay me out, I want to be laid out in my black silk dress; but take out the back panel and make yourself a dress from it."

Sarah said: "Oh, Aunt Mary, I don't want to do that. When you and Uncle John walk up the golden stairs, I don't want people to see you without any back in your dress."

"They won't look at me," the old lady replied. "I buried your Uncle John without his pants!"

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